

THE RADIO AMATEUR'S JOURNAL FOR SPECIALIZED COMMUNICATIONS

# SPEC-COM™

OFFICIAL PUBLICATION OF THE UNITED STATES ATV SOCIETY

MAY/JUNE 1991

VOL.21 NO.3

PUBLISHED BI-MONTHLY

\$3.50

AMATEUR FSTV SLOW-SCAN TV RADIOTELETYPE FACSIMILE AMTOR OSCAR TVRO  
PACKET RADIO SATELLITES MICROWAVE DIGITAL WEFAX COMPUTERS SHORTWAVE

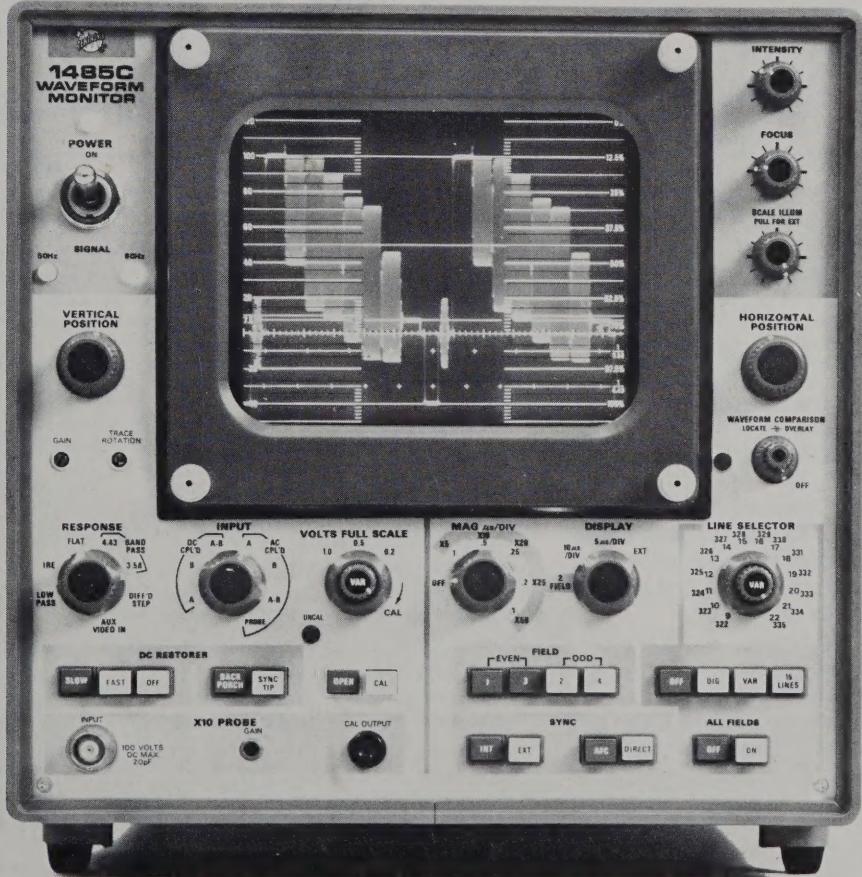
## AEA TO CO-SPONSOR, DISTRIBUTE NEW HAM-TV BOOK!

FM-TV INTEREST CONTINUES WITH IN-FIELD TESTING  
NEW ATTENDANCE RECORDS SET AT 1991 DAYTON HAMVENTION!

BUILD YOUR OWN "MECHANICAL TV" PROJECT INSIDE THIS ISSUE!

MARSHALL, AL ARC "WORKS THE SHUTTLE" - STS-37 FSTV

NEW "FROM THE WORKBENCH" EDITOR N9JL COVERS BALLOON LAUNCHES  
USATVS WESTERN REGIONAL DIRECTOR N0IVN "VISITS CHINA!"  
RF CONCEPTS/T.E. SYSTEMS "AMP" REVIEWS!  
and lots more....



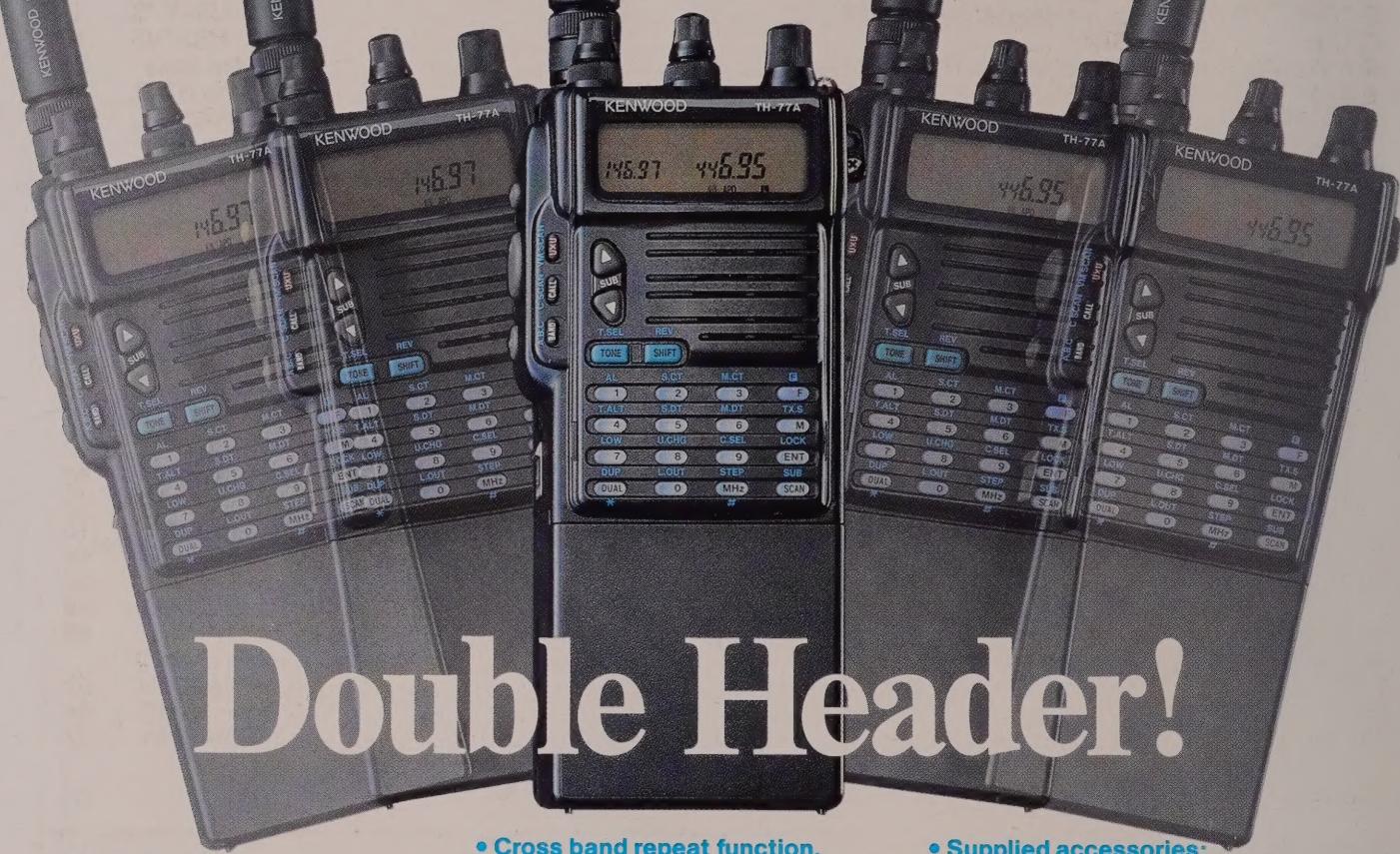
TEKTRONIX 1480 Series Waveform Monitor

THE SPEC-COM Journal  
P.O. Box 1002  
Dubuque, Ia 52004-1002

DARRELL GOULARTE  
310 FARMER STREET  
FELTON OH 95018  
MAIL ZONE 7  
EXP. DATE 03/92

SECOND CLASS  
U.S. POSTAGE  
PAID  
Dubuque, Ia

# KENWOOD



## Double Header!

### TH-77A

#### Compact 2m/70cm Dual Band HT

Here's a radio that deserves a double-take! The TH-77A is a feature-packed dual band radio compressed into an HT package. The accessories are compatible with our TH-75, TH-25, and TH-26 Series radios. Repeater and remote base users will appreciate the DTMF memory that can store all of the DTMF characters (\*, #, A, B, C, and D) that are usually required for repeater functions!

- Wide band receiver coverage.** 136–165 (118–165 [AM mode 118–136] MHz after modification) and 438–449.995 MHz TX on Amateur bands only. (Two meter section is modifiable for MARS/CAP. Permits required.)

- Dual receive/dual LCD display.** Separate volume and squelch controls for each band. Audio output can be mixed or separated by using an external speaker.

Complete service manuals are available for all Kenwood transceivers and most accessories. Specifications and features are subject to change without notice or obligation.

- Cross band repeat function.**
- Dual Tone Squelch System (DTSS).** Uses standard DTMF to open squelch.
- CTCSS encode/decode built-in.**
- Forty-two memory channels.** All channels odd split capable.
- DTMF memory/autodialer.** Ten 15-digit codes can be stored.
- Direct keyboard frequency entry.** The rotary dial can also be used to select memory, frequency, frequency step, CTCSS, and scan direction.
- Multi-function, dual scanning.** Time or carrier operated channel or band scanning.
- Frequency step selectable for quick QSY.** Choose from 5, 10, 12.5, 15, 20, or 25 kHz steps.
- Two watts (1.5 W on UHF) with supplied battery pack.** Five watts output with PB-8 battery pack or 13.8 volts. Low power is 500 mW.
- DC direct-in operation** from 6.3–16 VDC with the PG-2W.
- T-Alert with elapsed time indicator.**
- Automatic repeater offset on 2 m.**
- Battery-saving features.** Auto battery saver, auto power off function, and economy power mode.

#### Supplied accessories:

Flex antenna, PB-6 battery pack (7.2 V, 600 mAH), wall charger, belt hook, wrist strap, keyboard cover.

#### Optional accessories:

- BC-10:** Compact charger • **BC-11:** Rapid charger • **BH-6:** Swivel mount • **BT-6:** AAA battery case • **DC-1/PG-2V:** DC adapter
- DC-4:** Mobile charger for PB-10 • **DC-5:** Mobile charger for PB-6, 7, 9 • **PB-5:** 7.2 V, 200 mAh NiCd pack for 2.5 W output
- PB-6:** 7.2 V, 600 mAh NiCd pack • **PB-7:** 7.2 V, 1100 mAh NiCd pack • **PB-8:** 12 V, 600 mAh NiCd for 5 W output • **PB-9:** 7.2 V, 600 mAh NiCd with built-in charger
- PB-11:** 12 V, 600 mAh OR 6 V, 1200 mAh, for 5 W OR 2 W • **HMC-2:** Headset with VOX and PTT • **PG-2W:** DC cable w/fuse
- PG-3F:** DC cable with filter and cigarette lighter plug • **SC-28, 29:** Soft case
- SMC-30/31:** Speaker mics. • **SMC-33:** Speaker mic. w/remote control • **WR-1:** Water resistant bag.

KENWOOD U.S.A. CORPORATION  
COMMUNICATIONS & TEST EQUIPMENT GROUP  
P.O. BOX 22745, 2201 E. Dominguez Street  
Long Beach, CA 90801-5745

KENWOOD ELECTRONICS CANADA INC.  
P.O. BOX 1075, 959 Gana Court  
Mississauga, Ontario, Canada L4T 4C2

# KENWOOD

...pacesetter in Amateur Radio

MAY/JUNE 1991 VOLUME 21 NUMBER 3

# THE SPEC-COM JOURNAL™

## EDITORIAL, NEWS, LETTERS & ANNOUNCEMENTS

FROM JAWS JAW - Editorial Comments .....	Mike Donovan KAOJAW	5
HOT OFF THE WIRE! - Latest Specialized Mode News .....	USATVS	7
LETTERS TO THE EDITOR .....	USATVS	9
QSO AMATEUR RADIO TVRO SATELLITE PROGRAM!	Jim Bass	20
A.E.A. SPONSORS/DISTRIBUTES NEW ATV HANDBOOK .....	Mike Lamb N7ML	20
TWO MORE 'ON-THE-AIR' HAM CARTOON CLASSICS! .....	Al LaVorgna WA2OQJ	

## FEATURE ARTICLES, REVIEWS, NEW PRODUCTS

DAYTON 1991 HAMVENTION REPORT! .....	Mike Stone WB0QCD	18
CONVERT YOUR BIRD 43 WATTMETER TO READ P.E.P POWER .....	Bob Crews KJ4CQ	22
WHAT WAS MECHANICAL TELEVISION? 16 PAGE BUILDING PROJECT!	Peter Yanczer K0IWX	23
FSTV CONTACT WITH ATLANTIS! STS-37 MISSION .....	W3PM, W4QUA & The Marshall ARC	48
RF CONCEPTS 2/70G ANNOUNCEMENT & 4-110 AMPLIFIER REVIEW .....	Steve Whiting N8LWX	52
ANTENNA CRAFT G1483 UHF-TV ANTENNAS .....	Mike Stone WB0QCD	54

## REGULAR COLUMNS

SYNC-BUZZ - Amateur Fast Scan TV .....	Mike Stone WB0QCD	10
CLUBS, CONTESTS & SPECIAL EVENTS! - What's Happening Around the Country .....	Dale Lam WA0NKE	12
FAST FORWARD VIDEO - TV Questions & Answers .....	Ron Hranac N0IVN	16
CATHODE GLOW - Preserving Early TV & Radio History .....	James Hawes KB9EPQ	44
THE MONITORING POST - Shortwave and Scanners .....	Mike Donovan KAOJAW	57
RTTY AUTOSTART - Radioteletype, ASCII and AMTOR .....	Al LaVorgna WA2OQJ	58
FROM THE WORKBENCH - Building Projects and Ideas .....	John Lutz N9JL	60
DIGITAL FRAMESTORE - Slow Scan TV & Facsimile .....	Fred Sharp W8ASF (Column Not Received)	
SPACE TALK! - OSCAR, NASA & Foreign Satellite News .....	Joe Holman KA7LDN	62
ON-LINE COMPUTERS - This Month: Packet Radio Basics .....	Rich Bono NM1D	64
ON THE G.O.E.S. - Advanced Satellite Weather Facsimile Technology .....	Greg Mengell KA6DPV	67

"E-X-P-A-N-D-I-N-G to 80 pages in our NEXT issue!"

## PUBLISHER'S STATEMENT

SPEC-COM (tm) ISSN 0883-2560 is published bi-monthly by SPEC-COM Communications & Publishing Group, Ltd. An Iowa based Corporation, our USATVS Membership Services & SPEC-COM Journal Main Administrative Office (KAOJAW) is located at P.O. Box 1002, Dubuque, IA 52004-1002 (for UPS or Federal Express delivery) 1019 Shady Lane, Dubuque, IA 52204-1002. Our Clarence, IA Editing/Advertising Office (WB0QCD) is located at R2 Box 86, Clarence, IA 52216-9534. Subscription Rates: one-year, six issues, for USA & territorial possessions: \$20.00. Canada & Mexico: \$25.00. All other countries: \$30.00 (surface delivery). Special USA only 3-issue TRIAL subscription: \$10.00. Multi-year renewal discounts honored: USA 2-years: \$38.00. 3-years: \$56.00. 5-years: \$92.00. Lifetime Subscriptions: \$400.00 (based on 20 years). A USA subscription to The SPEC-COM Journal automatically entitles USATVS Membership unless otherwise stated. USATVS Memberships are available at no charge without subscriptions to the sponsored magazine. Subscriptions and other orders payable in U.S. funds only, International Money Orders or checks drawn on USA banks. USA single copy suggested retail selling price: \$3.50. Out of stock, back issues available via ESF Copy Service, 4011 Clearview Drive, Cedar Falls, Iowa 50613. Iowa residents must include 4% State Sales Tax.

SECOND CLASS POSTAGE PAID AT DUBUQUE, IOWA.

POSTMASTER: SEND ADDRESS CHANGES TO: SPEC-COM COMMUNICATIONS, P.O. BOX 1002, DUBUQUE, IA 52204-1002.

Subscription/Order Toll-Free Hotline: 1-800-468-3545 [8 am to 8 pm Pacific]  
Dubuque Executive Office, Membership Services (KAOJAW): (319) 557-8791 [24 hours]

Dubuque Printer Facsimile: (319) 556-3414 [Attention Greg]  
Dubuque Electronic Cottage National Telephone BBS: (319) 582-3235 [300-2400 baud at 8-N-1]  
Clarence Editing/Advertising Office (WB0QCD): (319) 452-3628 [24 hours]  
Clarence Facsimile: (319) 452-3837 [Attention Mike Stone - 8 am to 5 pm]

**COPYRIGHT:** SPEC-COM is the official journal of The United States ATV Society. The entire contents of The SPEC-COM Journal including covers, our former publication: A5 ATV Magazine, books, databases and material stored on our Electronic Cottage National Telephone BBS, are protected by U.S. Copyright Laws (C) 1991 by SPEC-COM Communications & Publishing Group, Ltd. All rights reserved. Permission is granted to individual "paid" members, affiliated clubs and groups, for limited reprint rights provided proper credit is given to the author and the originating source(s) of information. Please forward a copy to our office prior to distribution. No whole copy duplications of this journal are allowed. Text manuscripts, photos and circuits from reader's are welcome. Some authors are paid for submitted material. We prefer IBM format ASCII text files on 5.25" 360K disks. Contact WB0QCD for details. Please use our EC BBS for uploading or mail your material to us directly. **DISCLAIMER:** Although this Journal makes every effort to obtain technical accuracy, publishers disclaim any responsibility for circuit errors, damage or harmful effects that may occur during the building or operating process. Opinions presented or expressed within this issue, are by the contributing editor, writer or author of the statement(s) and are not necessarily those of the sponsor or publishers.

# If You Are Active In Specialized Modes

YOU SHOULD BE SUBSCRIBING TO:

## The SPEC-COM Journal!

Our 24th Year! (\*A5) More combined specialized articles per year than any other Ham Radio publication!

Full Color Glossy Covers. 80 pages per issue. Published bi-monthly 6 times per year. Covering "ALL MODES" of Specialized Communication: FSTV NBTB SSTV FAX WEFAX RTTY AMTOR PACKET OSCAR TVRO LPTV MICROWAVE SATELLITES SHORTWAVE LASERS RADAR SPREAD-SPECTRUM COMPUTERS (and lots more)!

**14 Feature Paid Column Editors:** Mike Donovan KA0JAW "Editorial & Shortwave Radio", Mike Stone WB0QCD "Sync-Buzz ATV", Dale Lam WA0NKE "Clubs, Contests & Special Events", Ron Hranac N0IVN "TECH Q&A", James Hawes KB9EPQ "Cathode Glow - Early TV & Radio", John Lutz N9JL "From the Workbench", Mike Veldman WD0CTA "Microwave Digest", Fred Sharp W8ASF "Digital Framestore - SSTV & FAX", Al LaVorgna WA2OQJ "RTTY Autostart & Cartoons", Greg Mengell KA6DPV "On-The-G.O.E.S. WEFAX", Joe Holman KA7LDN "Space Talk - NASA, OSCAR & Satellites" and Rich Bono MN1D "On-Line-Computers". Over 20 regular Article Writers/Authors! National EC Telephone BBS! USATVS Lobby Group! Contests!



March/April 1991 "Dayton" Issue - Volume 21 Number 2

Back Issues \$3.00 ppd

## Covering FAX Since 1975!

YES! I want to sign-up for a subscription to  
**THE SPEC-COM JOURNAL!**

Enclosed is my check or money order.

	USA	Can/Mex	DX
1 Year - (6 issues) .....	\$20.00	\$25.00	\$30.00
*2 Years - (12 issues) .....	\$38.00	\$48.00	\$58.00
*3 Years - (18 issues) .....	\$56.00	\$71.00	\$86.00

Send a copy of your new Amateur TV Handbook! (\$8.95) plus \$1 S/H  
Your USA bank checks, Money Orders, Credit Cards are Accepted.

Master Card     Visa (5% Added)

Name: \_\_\_\_\_ Call Sign: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Credit Card Number \_\_\_\_\_ Exp. Date: \_\_\_\_\_

SPEC-COM COMMUNICATIONS & PUBLISHING GROUP, LTD.  
P. O. Box 1002 - Dubuque, Iowa 52004 - 1002

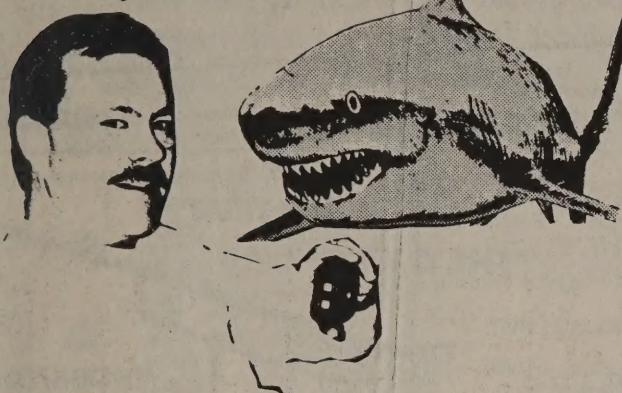
"A5 ATV Magazine" (tm) (our former publication) and The SPEC-COM Journal (tm) (started March 1985) have been publishing Facsimile and WEFAX mode articles and information for the past 16 years, since 1975! No other Ham Radio Magazine has done that. None. Greg Mengell KA6DPV (former Editor of JES AUG) has now joined our staff of talented writers with a regular multi-page "ON-THE-G.O.E.S." WEFAX Column in each issue. Check out the special WEFAX Menu section on our Dubuque, Iowa Electronic Cottage National Telephone BBS (319) 582-3235 [24-hour on-line operation at 300-2400 baud 8-N-1]! Join our WEFAX seminars each year at Dayton at the RAMADA INN NORTH. We support Tom Glembocki KO4BD's new "WeatherSat Ink" Newsletter by contributing material, providing help in distribution and by AD exchange. LET'S TALK FAX! Call this TOLL FREE number and let's get acquainted: (Ask for Greg)

1-800-468-3545

Iowa Offices: (319) 557-8791 or 452-3628

# **Editorial Comment**

**by Mike Donovan KA0JAW**



## **FROM JAW's jaw**

As specialized mode enthusiasts, we must set our territorial feelings aside, combine our resources, and we must join together to protect our scarce frequencies! ATVers, Satellite users, and weak signal operators can, and do, co-exist with in the current band plan, but we are being squeezed out by business and other services. I believe the time is now to join together, understand the severity of the situation, and plan the needed action before we all find ourselves with nowhere to operate. I propose a task force to address the issues and jointly present our case to the ARRL and the FCC. I have been contacted by some of the leaders in our hobby with interest in a task force. Please don't sit back and HOPE others will carry the banner for you. We need the serious interests of ALL specialized modes represented. Contact me by phone or letter to become involved in this needed action. This plea goes to all AMSAT, FM Link, Packet, ATV, Weak Signal, and other specialized mode leaders. We need your input, your support, and your involvement.

I ran across this information the other day and felt it summed up the emotions of all of us at Spec-Com. I wanted to share it with you because it applies to all of us and I hope that you will enjoy a minute of reflection. The author is unknown, but a wise person. We all get caught up at times in the rat race, rely on our past successes, and lose focus on the important issues. I hope this information is of help to you from time to time. I know it is to me.

*Here's a question I'll bet you could ask a thousand working people and never get the right answer. The question is: "Who's the Boss?"*

*There's only one boss, and whether a person shines shoes for a living or heads up the largest corporation in the world, the boss remains the same. IT'S THE CUSTOMER! He is the person who pays everyone's salary and who decides whether a business is going to succeed or fail. And he doesn't care if a business has been around a hundred years. The minute it starts treating him badly, he'll put it out of business.*

*In fact, this customer can fire everyone in the company from the president on down. And he can do it by simply spending his money someplace else. This is one of the reasons why taking pride in the work we do is so important to us personally. Doing*

**SPEC-COM - The USATVS Journal - Page 5**

*an exceptionally good job will not only bring joy and satisfaction, it will help get more customers, keep the ones you've got, and insure that you continue to get a pay check from your bosses.*

*Some of the largest companies that had flourishing businesses a few years ago are no longer in existence. They couldn't - or didn't - satisfy the customer.*

Wow, the 1991 Dayton Hamvention is over and what a great time it was! A time to see old friends and make new ones. The Spec-Com forums were packed this year as we presented a reflection of the past on Friday night for Television and Radio experimenters as well as collectors. Looking back on the past helps us move forward toward the future.

We held our ATV and WEFAK forums on Saturday night to avoid conflict with other similar events taking place on Friday night. The turn out for this annual event was tremendous and we apologize to those we had to turn away because of shortage of seats. We are investigating larger facilities for next year.

Drawings were held on Friday night for several of Peter Yanczer's fine book (**THE MECHANICS OF TELEVISION**). On Saturday night the hat was bulging with entries for our drawing. All those who attended the forums as well as those names submitted by ATV clubs around the country were eligible to win. Jack Friend, N0HYS of Independence Mo. was our first place prize winner. Jack won a brand new AEA ATV transceiver! James Easley, KE8PN and Don Price KB5VP were winners of a one year subscription to the Spec-Com Journal! Congratulations to all our winners and thank you to all who attended, made the presentations, and those who helped make this years forums the best ever.

The activity at our booth was very good this year and we look forward to seeing you again soon as we travel to hamfests and conventions.

With summer upon us, I have undertaken an ATV repeater/remote base building project here in the Mid-West. The KAOJAW/R system will soon be on the air for testing and debugging. I am in need of ideas for video feeds for this 10 channel remote base. Please drop me a line and let me know what your group has on the air and maybe I can use a couple of the ideas. Any input will be greatly appreciated. We would also like to share this information with others by printing it in the Spec-Com Journal. We do need your help; we need your support with your construction stories, news tips, special event notices, and sharing of information with us all here in the pages of Spec-Com. We also need you to urge others to subscribe.

***The Spec-Com Journal now has a toll free order service for you. To order your subscription call 1-800-468-3545 today!***

***Check your subscription date on the label and renew early. We accept both Visa and Master Card for your orders.***

***Thank you for your support....***

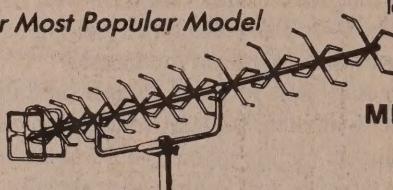
**si****SPECTRUM INTERNATIONAL, INC.**

"We are a  
SPEC-COM Journal  
Supporter!"

Post Office Box 1084-SC  
Concord, Massachusetts 01742  
(508) 263-2145

**JAYBEAM**

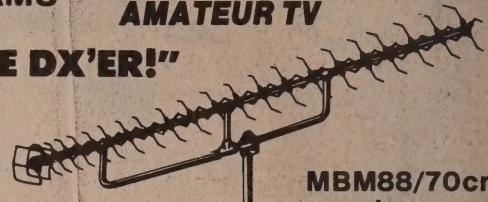
Our Most Popular Model

**70 cm MULTIBEAMS**

WIDEBAND WIDTH  
LOWEST V.S.W.R.  
Ideal for ATV!

**MBM48/70cm**  
**\$110**

ALL ANTENNAS INCLUDE 50 ohms Balun

**AMATEUR TV****"THE DX'ER!"**

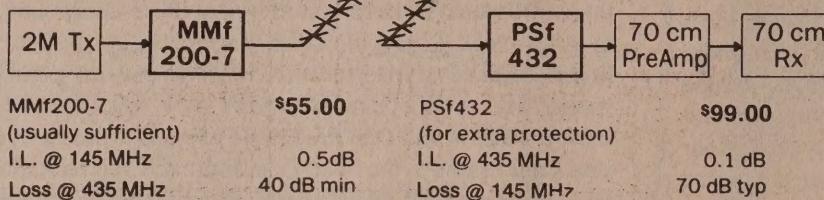
**MBM88/70cm**  
**\$150**

**CROSSED YAGIS**

FOR WEATHER FAX

**OSCAR MODE-J FILTERS**

PREVENT DESENSE OF YOUR DOWN-LINK RECEIVER

**A-N-N-O-U-N-C-I-N-G!**

We are proud to announce that we have been appointed North American and International Distributor of the English manufactured - TIME-STEP line of affordable, high-quality, Weather Facsimile Receive Systems!

See our special AD about this equipment on page 47 of this issue.

**RECEIVE CONVERTERS**

6 Meter	10M IF	\$ 75
2 Meter	10M IF	75
435 MHz	10M IF	114
70cms ATV	TV Ch IF	115

**TRANSVERTERS**

6 Meter	2M IF	\$345
2 Meter	10M IF	315
70 cms	10M IF	ask

**J-BEAM ANTENNAS**

137 MHz	2XY-137-C	\$ 90
	5XY-137-C	110
2 Meters	10XY-2M	\$130
	Circ. Pol. Harness	20
435 MHz	70-MBM28	\$ 60
	70-MBM48	\$110
	70-MBM88	\$150
90 MHz	DY20-900	\$ 95

**LOOP-YAGIS**

23 cms	1268-LY	\$ 70
	1296-LY	70
1690 MHz	1691 LY(N)	\$92
Extensor Kits	1268-LY-XTN	70
	1296-LY-XTN	70
	1691-LY-XTN	75

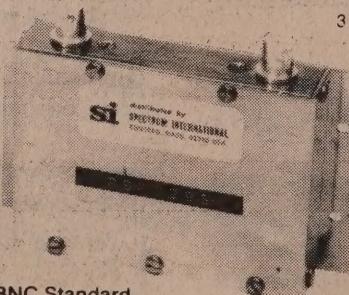
ALL ANTENNAS INCLUDE 50 ohm Balun

**THANKS TO ALL WHO VISITED OUR BOOTH AT DAYTON!**

Dorothy and I would like to take this opportunity to thank each and every one of you for stopping by our booth in the Main Exhibit Hall in Hara Arena at the 1991, 40th annual, Dayton Hamvention. Each year, this event gets better and better. The "SPEC-COM" fellas shared a corner of our booth with us this year which drew even more observers and helped us out answering questions as well. A "TIME-STEP" representative from England was present to answer your WEFAQ questions. We welcome this company's manufactured products to our fine line of equipment! We are certainly looking forward to "next year" for visiting with you again. Send an SASE (3/29's) for our latest catalog. 73s -John Beanland G3BVU/W1

**VHF/UHF BANDPASS FILTERS**

KNOCK OUT INTERFERING  
ORM OR SELF-DESENSE!



BNC Standard  
TNC or Type 'N' optional  
(slightly higher prices)

3 and 5 pole models available	
MMF-200-7	Oscar 'J'
PSF 137-3	132-142
PSF 144-3	140-150
PSF 220-3	216-228
PSF 432-3	420-450
PSF 421-5	ATV Channel
PSF 426-5	ATV Channel
PSF 434-5	ATV Channel
PSF 439-5	ATV Channel
PSF 900-3	890-940
PSF 923-5	ATV Channel
PSF 1280-3	1230-1320
PSF 1250-5	ATV Channel
PSF 1296-3	1250-1340
PSF 1691-3	1650-1750
PSF 1280-FM	FM TV Channel

**ARE YOU  
EXPERIENCING  
QRM PROBLEMS?****1200 MHz Filters:****PSF1253-5 \$175.00****PSF 1280-FMTV****20 MHZ BW \$175.00****Less than 2 db  
Insertion loss****WRITE FOR OUR  
LATEST CATALOG!**

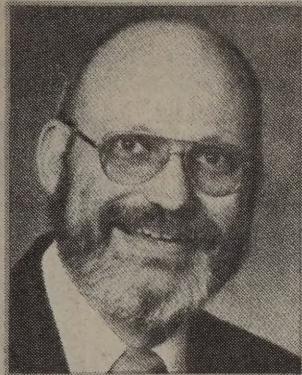
Send 75¢ (3 stamps) for detailed specs on all VHF &amp; UHF products. Shipping FOB Concord, MA

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE

**SPECTRUM INTERNATIONAL, INC.**

P.O. Box 1084-SC Concord, MA 01742, USA

**(508) 263-2145**



## CO-FOUNDER OF AEA GEORGE BUXTON N7EZJ - SILENT KEY

It is with great sadness that we report to the membership the passing of Advanced Electronics Applications co-founder George Buxton N7EZJ. He died December 30th 1990. George and Mike Lamb N7ML of AEA were very close friends. They worked together at John Fluke Manufacturing Company in the early 1970's. They parted company and each went their own way for a few years until coming together once again in 1977 when together, they formed AEA as equal shareholders. George's business ethics were of the highest caliber and he was instrumental in helping establish AEA's reputation for fairness in all dealings with customers and suppliers. George Buxton was the fiscal manager of AEA while Mike Lamb took over marketing duties. George is missed at AEA and within the Amateur Radio industry. Our condolences to his family and to Mike Lamb N7ML on the loss of such a good friend. SPEC-COM.

### DON FULLER W2WHK RECOVERING FROM DAYTON HEART ATTACK

We are glad to report that Don Fuller W2WHK of PAULDON ASSOCIATES is recovering nicely from a mild heart attack experienced Sunday at Dayton.

### WB0QCD AD AGENCY GETS "QSO AMATEUR RADIO" ACCOUNT!

Mike Stone WB0QCD has been awarded an AD AGENCY contract with the new "QSO AMATEUR RADIO" TVRO program now being aired on Monday nights (5 times per week in late May or June) on the GTE Spacenet 1 Satellite (120 degrees West) Channel 15. The all-Ham sponsored program aired by Jim Bass and Associates from the Syracuse, NY area is now being seen in 39 countries reaching an estimated 400,000 TVRO enthusiasts. Send SASE for advertising rates & additional information to: R2 Box 86, Clarence, IA 52216-9534 or call (319) 452-3628.

### BICYCLE ACROSS AMERICA 2ND VOYAGE TRIP TO INCLUDE PSTV!

Remember Steve Roberts N4RVE, the high-tech, solar powered, cyclist who peddled his way across 16,000 miles of America on a computerized, all-mode vehicle that captured the nation's attention? Well, he's getting ready for yet another trip this summer in July. This time, his bike (estimated at \$1 million) is 8 foot long, has 54 speeds and will include ATV! AEA fixed him up with a small color TV transceiver. SPEC-COM and The USATVS is among 130 corporate sponsors for the '91 event. Watch for him peddling and transmitting TV & 2 meters through your town!

### RECORD HAWAII TO WEST COAST PSTV DX ATTEMPT PLANNED!

The MAY 13th Spacenet 1 TVRO broadcast of "QSO Amateur Radio" included guest Gordon West who informed listeners of an ATV transmitter that has been placed on the slopes of the active Volcano Monaloha at 434.000 MHz by beam antenna (horizontally polarized) aimed toward the USA (2,500 miles). It is hoped that with the DX season months of June, July and August, that some USA contacts might be made. The dilemma for Californians now is in making the decision to flip their antennas to HORIZONTAL polarization (pulses will rise!) and to then point westward toward the Pacific.

### ICOM'S "MORE THAN RADIOS" RELEASED

On January 16th, several Radio Amateurs and special invited guests previewed ICOM's newsst film release in Bellevue, WA. The film was again shown at Dayton this year at the FM BASH. Chuck Zappala KE7SA was the Director. Copies are available for Clubs from ICOM for public viewing. Watch for it also to appear on the "QSO Satellite" Program on Spacenet 1 Channel 15.

SPEC-COM  
The USATVS Journal

**NEWS BULLETIN**



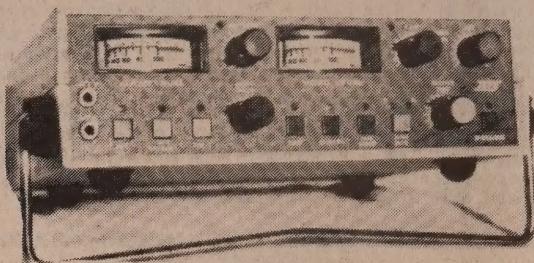
## HOT OFF THE WIRE!

For more Specialized News, fire up your computer and  
Call our ECBBS at (319) 582-3235

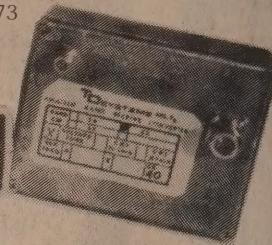
FLASH-SPEC-COM INCREASES TO 80 PAGES NEXT ISSUE!

# Designed For Those Who Will Settle For Nothing But The BEST!!

CU-125



Reviewed by W9DNT and NOIVN in May/June & Sept./Oct. '90 SPEC COM and August '73 Magazine.



**Why operate anything less than the best in a multi-mode, UHF ATV transceiver system? T.D.S. offers more available "add when ready" high-tech features over any other manufacturer!**

Features: AM/FM TRANSMIT or RECEIVE options, ON-CARRIER as well as 4.5 MHz. Subcarrier Sound, On-Board Meter & L.E.D. Indicators, AUTOMATIC Video Gain & Level Control, Multi-band Operating Modules, Low-pass Filtering, Sync-Stretching, Crystal Controlled Stability, Preview & On-Air Monitoring, Reprogramable Frequency Select, Soft-touch Electronic Switching and many other advantages too numerous to mention here in this AD!

Build up your own system on 70, 33 or 23 cm. Our handy CU-125 Remote Control Unit feeds all other RF modules. Our newest model ATV unit is housed in a single RF tight metal cabinet and it controls all other interfaced modules.

Power Requirements: 12 - 14.5 VDC.  
Operate from Fixed Base or Mobile  
Superior NTSC Video and Audio.  
Full Color Panel display (CU-125)!



Shipping/Handling - Texas Residents  
Must Add 7% Sales Tax

## T D SYSTEMS

NEW "ALL IN ONE"  
Economy FSTV Transceiver!  
Complete Transmit/Receive Unit with Audio  
Subcarrier (less meters) in single cabinet... CU-100

### AM TRANSMITTERS

T70 AM	70 CM
T33 AM	33 CM
T23 AM	23 CM

(2nd Frequency or On-Carrier Audio Add \$10.00)

### FM TRANSMITTERS

T33 FM	33 CM
T23 FM	23 CM

### FM DEMODULATOR RECEIVER

(Installs in CU-125)

### RDB-FM

#### RECEIVE CONVERTERS

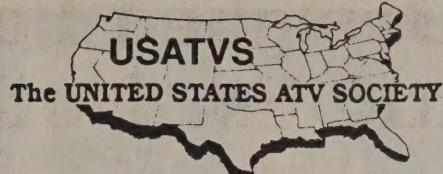
C-70	70CM
RCC - 10	Controller
RVT - 70	70 CM
RVT - 33	33 CM
RVT - 23	23 CM

Crystal Control Option  
Add 2nd Frequency

**"ASK ABOUT OUR NEW ALL-IN-ONE CU-100 FSTV TRANSCEIVER  
NOW BUILT IN OUR CU-125 REMOTE CONTROL HEAD CABINET!"**

**T.D. SYSTEMS - STEVE FRANKLIN WB5KGL**  
2420 Superior Drive - Suite B, Dept. SC - Pantego, Texas 76013 - Call (817) 861-5864

# Communications from members . . .



Send your comments to: "Letters to the Editor"  
P.O. Box 1002, Dubuque, IA 52004

**From Bill Shinn WB9PLR, Newburgh, Indiana:** "I wish to write and thank the people involved in putting together and hosting the Dayton RAMADA INN NORTH Specialized Communication WORKSHOP sessions. I attended and learned quite a bit from both evening sessions. As a result, I went out into the Dayton Flea-Market area and purchased a used, P.C. Electronics 10-watt TC-1 ATV Transceiver, a roll of Belden 9913, a TONNA UHF antenna and (thanks to the help of WB0QCD) am purchasing a 100-watt RF CONCEPTS amplifier from a fella up in Michigan (Steve Whiting). There isn't any FSTV in my area that I know of so I will be looking for nearby DX. I would appreciate some of you ole'timers within a hundred miles range to get ahold of me so we can start sending pictures. I'd like to mention a few items that I have recently purchased that might be of particular interest to other USATVS members out there. KJI ELECTRONICS PO Box 438, Cedar Grove, NJ 07009 (Phone (201) 239-4389) has an ongoing SALE on TONNA 438-421 MHz UHF antennas that work good for ATV as well. The price? \$55.00 new! RADIO SHACK now has a few more new items useful to UHF enthusiasts (Page 54 of the 1991 catalog): Cat. No. 19-320 SWR/Power Meter \$39.95, two ranges 0-15 watts and 0-60 watts. It is in a sealed diecast aluminum enclosure also useable on 2 meters. Cat. No. 21-506 50-Ohm Dummyload \$21.95. Rated DC-500 MHz. Power: 15W continuous, 20W for 5 minutes ON 3 minutes OFF, 50W for 1 minute ON 3 minutes OFF or 100W for 30 seconds ON 3 minutes OFF. Thanks again for the help guys in getting started... -Bill Shinn WB9PLR

**To ALL USATVS Members:** Members of the Marshall Amateur Radio Club, Alabama successfully made history Sunday, April 7, 1991 by sending fast scan tv to a U.S. spacecraft. Astronaut Ken Cameron, KB5AWP, picked up the video from the Huntsville club station WA4NZD, aboard space shuttle Atlantis flight STS-37. Several of the Marshall Amateur Radio Club members are also members of TVATV (Tennessee Valley Amateur Television) which operates an inband atv repeater in the Huntsville area. Once Astronaut Cameron radioed he was receiving video of the callsign, the Huntsville hams switched on a video camera and sent the shuttle live shots of the estatic hams themselves. There were some happy hams this Sunday morning! Basic equipment used was a PCE 70-1-d 70 cm transceiver, a MIRAGE D100 which was in turn amplified by a 300 watt MOTOROLA amplifier. MARC members were making some final checks when power started dropping on the 300 watt amp and pictures started going into nothing land. Yep, several transistors in the MOTOROLA AMP were dying. At that point, it was decided to steal good transistors from the driver stage, put them in the final stage and use a 100 watt MIRAGE (D1010N) as a driver. Back to a 300 watt signal again, this as fed into a four bay circularly polarized helical antenna built by club member Gene Marcus W3PM. ERP was 30,000 watts ERP. Ken reported P4 pictures (near perfect) but no color. Typical of an extremely excited bunch of ATV hams, we forgot to turn on the 4.5 FM audio subcarrier. Many thanks to the folks involved with SAREX and to those terrific hams in space! 73's KK4HF

**From George Procks, Timonium, Maryland** "I was given this address from Ken McIntosh when I went to visit him and to view his Early TV collection. He has a very impressive collection. The reason I am writing is because I am having a lot of trouble finding a club, periodical, newsletter or anything dealing with TV collecting. I have developed an interest in this area even though I am only 28 because I have always enjoyed electronics and am presently a PC technician. I have a small collection at this point and am particularly interested in the 1950 vintage material. I have two different Predictas, a 1957 RCA portable, a 1958 G.E. portable, an early Bendix and an early Admiral. I also have a small collection of radios. Please send information!" -George Prock, PO Box 4952, Timonium, MD 21093. [EDITOR'S REPLY] George: Try to get in contact with the Ham members of B.R.A.T.S. (Baltimore Amateur Television Society). They might be able to steer you on to key people and collectors in your area. The USATVS has been supporting this adventure for several years now. Visit Mel Dunbrack W1BHD in Malden, Mass. if possible or Arnold Chase's collection up in Connecticut. We are assembling a new Ralph Wilson ESF COPY SERVICES booklet #115 on Early TV & Radio which should be done by next month (\$10.00) that you might want to purchase. Do you subscribe to Antique Radio Classified? Contact them at PO Box 802-L6 in Carlisle, MA 01741. I am also asking Jim Hawes KB9EPQ, our new Early TV & Radio column editor, to send you a list of possible names and sources as well. Hope this gives you some places to check with. Good luck! Send us some pictures! -Mike Stone WB0QCD



**A MODERN DAY CHALLENGE...****SYNC-BUZZ ATV COLUMN**

by Mike Stone WB0QCD

**DAYTON HAMVENTION/WORKSHOP SESSIONS**

What a great time we had at Dayton this year! The 6th annual Friday and Saturday night RAMADA INN NORTHERN "Specialized Communication Mode" WORKSHOP sessions were once again very successful. We set new attendance records. 17 out of the planned 18 scheduled speakers showed up. I must comment that the quality of our chosen speakers is always excellent. We don't just grab anyone to fill up the timeslots - we carefully choose those active in the modes and who are actually doing something positive and of great interest to the Ham fraternity. Friday night's session was of a rare, once in a lifetime, special caliber. Our "special" EARLY TV & RADIO night conference session was quite unique and very rewarding to those who attended. We all got quite a show and education. To sit in the same room, to look, touch, hear about the history and development of and to watch each antique device presented in actual working operation - was simply mind boggling! Peter Yanczer's gear brought up carefully from St. Louis and Dave Johnson's equipment transported from Chicago stole the show! I want to thank these two individuals in particular for going to such efforts to educate the rest of us on our past history by showing us actual equipment pieces. Ken McIntosh's and Gerald Cromer's videotapes of their neat TV & Radio collections also had many glued to their seats in concentration. Jim Hawes our new EARLY TV & RADIO column editor did an excellent job talking and presenting a color slide show presentation. Thanks also to Jerald Hueber and the "Antique Radio Collectors Club of Ohio". They did a great late night job of talking and showing us old radios. It was comical. About 11 o'clock on Friday as things were starting to slow down from the TV era, one of the guys from Dayton asked if we would like to see some old antique radio stuff and nearly everyone sat right back down ready for more! During one of these talks, the first transistor pocket radio model was "turned on" to show how it still worked and just how good the sound was - when what did we hear but a 1954 Elvis Presley record being played "live" over the air. What timing! That will probably never ever happen again. It always happens at Dayton. This time it happened to me. I always make a point to introduce everybody one by one at our Conference sessions. Usually two people who live very close to each other and who do not know each other show up, both interested in ATV or some other mode and are delighted to meet in Room #101 at the Ramada. This time, a guy stands up and tells about his longtime interest in Early TV and Radio's and that he has his own collection and that he is from Davenport, Iowa. 30 miles from my doorstep in the heart of active ATV territory and nobody knew this guy. He isn't yet a Ham but will soon be. That's what our Conferences are for. Thanks for coming Tyrone Cutkomp.

It was FUN sharing partial booths with John and Dorothy Beanland from SPECTRUM INTERNATIONAL (#66, 67) in the Main Arena area. John has been there for many years and the Main Arena is a very much sought after booth position by all vendors. It is the central "HOT SPOT" that just about everyone strives to take a galk at. I took duty most of the day on Friday, Donovan took Saturday morning till noon, I relieved him at noon till 3 pm when Jim Hawes came by to take the rest of the afternoon (thanks Jim!). I manned the booth Sunday morning until 11 am. when we packed up and left back for Iowa. We received quite a few favorable comments about the new color look, LASER typesetting, page, author and column expansions and our consistent positive attitude of our magazine for the past 2 years. We also were delighted to visit with quite a few former subscribers who re-signed up with us. Thanks John for the exposure and I hope we get asked back again next year!

As you will see, this issue includes most of Peter Yanczer's handout material for actually building a Mechanical TV system. Peter has had a dream of getting together 5-10 inquisitive ATV operators to actually build up some of these old era sets (using today's readily available components) and to obtain legal FCC STA's to actually operate them cross-country as NARROWBAND TV (now being done in England). Imagine seeing FAIR resolution images of a fella from New York to Denver or Ohio to California? Talk could be coordinated on 40 or 80 meters. This idea is all explained in quite good detail in Peter's book THE MECHANICS OF TELEVISION. Who wants to take up the challenge of reviving history into today's modern electronic world? Write to Peter and let's get something going! He would like to get one station going in as many of the larger cities as possible to communicate with each other (maybe on 6, 10 or 160 meters). KB9EPQ is in Chicago, Mike Donovan KA0JAW and I are here in Iowa, K4NHN is in South Carolina, N0IVN is in Denver, CO, Peter Yanczer KOIWX is in St. Louis and there are others who have showed genuine interest in starting the project. Under the name NARROWBAND TELEVISION SOCIETY of the UNITED STATES, this small but brave new group could be the first pioneers of many to develop a new in-between Slow Scan TV and Fast Scan TV mode designation. This idea (although using mechanical TV components) is nothing new - Don Miller W9NTP tried to get some Hams interested in doing some MEDIUM SCAN TV experiments with FCC STA's required back in the early 70's. It takes people to give it a try and to make it work. Interested? Peter: It looks as if we might have yet another new NBTV column if you get some letters and/or phone calls. Let me know if SPEC-COM or The USATVS can help even further...

**New QSO AMATEUR RADIO Satellite Programs on GTE Bird!**

Watch for our SPEC-COM Journal TV video SPACE SATELLITE TVRO ADS on GTE's Spacenet 1 Channel 15 in the new "QSO AMATEUR RADIO" talk-shows run every Monday evening (expanding to 5 nights a week Monday-Friday sometime in May). These TVRO feeds run from 9:00-12:00 pm EST and are coordinated by Jim Bass, hosted by Jack Smith WA2QYT and uplinked from facilities provided by Jerry DeVine in Fabius, New York. Bill Brown WB8ELK is getting ready to do a "live" HAM-TV call-in and talk show (audio portion) during and after the regular Tuesday Night ATV USER'S NET on 3.871 MHz. Gordon West, Bob Heil and other prominent Hams are also being lined up to do their own shows. The satellite program is looking for first generation VHS program tapes (Super VHS, 3/4 UOMATIC, 1 or 2" formats preferred). If you have some interesting presentations having to do with Amateur Radio, send them (on loan) to Jim Bass, Director of QSO AMATEUR RADIO, PO Box 254, Syracuse, NY 13215. I sent them 5 tapes of the USATVS collection. If you have a LPTV station (like Harry Tootle has been promoting), would like to know how to get your local Cable-TV or PBS facility into carrying the show in your area, or would like to advertise on this bird's available timeslots, you might want to give me a call as I have been hired as the show's National Advertising Manager (319) 452-3628.

**New ATV HANDBOOK FINISHED - THEN ADDED TO...**

I finished up the new USATVS "ATV HANDBOOK" at 126 pages and brought the pasted up pages with me to Dayton to show everyone that it was done and to solicit advertisers. In going over the book with Steve Franklin WBSKGL from T.D. Systems he said it looked fine except it was missing one chapter. My heart sank hearing that and I asked him what I had missed. He responded "How could I make up an ATV manual that would most like be good for the next 5-10 years and NOT mention FM-TV?" Steve of course, is quite right and so, with Steve's help, we are adding a new chapter about FM versus AM. Hang in there folks, issues are coming and it looks like 140-150 pages...

**BUILDING UP OUR MEMBERSHIP DATABASE**

SPEC-COM COMMUNICATION & PUBLISHING GROUP LTD has been aggressive in seeking new business by a number of growth methods. We've had nearly 400 responses from our April issue RADIO ELECTRONICS "NO-CODE" article and offers. In mid-April, we purchased the USA mailing distribution list for "VHF Communications Magazine" from Fred Sharp W8ASF in Florida. At Dayton, we reached a written exchange and subscription swap agreement with the German DRAC ATV Group and their "TV AMATEUR" quarterly publication and renewed ties with the BATC. We have also obtained mailing lists from Antique Wireless Collectors, WEFAEX enthusiasts and ATV rig purchasers. We are still exchanging ads and articles with RADIOSCAN, DIGITAL DIGEST, MONITORING TIMES, WORLDRAADIO and other publications. Thanks to Joe Holman's new column, we now are also exchanging ADS with The AMSAT Journal publication! As a result of all this, we made a mass mailing of over 2,000 postcards in May letting all of these new potential customer/subscribers know about the fine work we are doing and about our bi-monthly publication. We are already seeing some significant results. Our numbers are climbing again!

**NEW AEA VSB-70 ATV RIG GIVEN AWAY!**

Some of you, I think, didn't believe that we would actually GIVE AWAY a real \$349.95 new A.E.A. VSB-70 FSTV transceiver at Dayton. The drawing, originally scheduled for Sunday at our DX'ers breakfast, was done Saturday night in front of everybody who attended. Angie, one of our sexy and delightful two "MISS AS" girls that greeted and registered everyone, picked out the winning callsign from a big bag of entry tickets (callsigns of ATV CLUB member entries advertised in previous issues plus those who attended our two-day WORKSHOP sessions). Congratulations to all the winners of the PRIZE drawings! See the list of contest entered callsigns elsewhere in this issue.

**FM TESTS PROVE QUITE SUCCESSFUL OVER AM**

Steve Franklin WBSKGL at T.D. Systems in Pantego, Texas has been raising a few eyebrows in the ATV community regarding his FM-TV experiments. Actually I shouldn't use the word "experiment" in the same paragraph with Steve's name regarding FM. As far as he is concerned there is "no experiment" period needed here in the USA - IT WORKS & IT WORKS QUITE WELL! Did any of you "see" Color Weather Radar being transmitted Sunday on 1255 MHz, 1-watt, 8 miles INTO (not to: INTO) HARA ARENA (beam to beam) on FM? PS pictures were received at the T.D. Systems booth (WB8ELK was surprised and so were a few others!). In Los Angeles WA6SVT (using T.D. Systems gear) now has an UNBELIEVABLE link going a distance of 110 miles into Las Vegas, NV running 10 watts on 1289 MHz (beam to beam) line of sight from a mountaintop location. Tests were conducted dropping the power level down to 1-watt with a P4-PS image picture holding. The guys from Las Vegas drove half way back toward California I am told, stopped 60 miles out, stuck a car key and a wire in the back of the FM receiver and witnessed P3-P4 images! The ATV troops in Dallas are convinced that FM linking is the way to go with a 900 MHz input to 1200 MHz output system. Did you know that T.D. Systems furnished the equipment on the FIRST FM ATV REPEATER SYSTEM that has been operating for over a year now? Did you know that the recent ROCKET LAUNCH from North Carolina with onboard AM & FM ATV had one of Steve's FM modules onboard? I was in the RAMADA bar Friday night after the conference session trying to unwind and overheard a fantastic story about FM-TV testing done in the Vancouver, B.C. area which could never have been accomplished (they tried) on AM. Once again, Steve's gear was being used and in fact, Friday night at the bar, the Canadians (COM-WEST Radio Systems Ltd.) became the first foreign distributor for T.D. Systems equipment. While most of us were ordering more beer, flirting with the foxy waitresses or yacking about what we bought (or missed) at the flea-market, Steve was busy in his own world jotting down electronic notes on a nearby drink napkin.

Did any of you take note that Steve Franklin WBSKGL took "FIRST PLACE" in last years Sunday morning DAYTON PREAMP MEASURING Contest? Talk about low-key promotion. This guy's a genuine gentleman letting his products do the talking for him! Yes, getting products from Steve's company is a bit slow. It reminds of APTRON in Indiana a few years ago. I hope Steve can hire some help and get going on getting product out the back door. He tries to do everything himself to assure only the best quality. If you want the BEST in ATV right now, you'll just have to get in line and WAIT.

**SOME FOOD FOR THOUGHT...**

All this recent FM success stuff kind of makes one wonder how FM would have worked on TV pictures being sent to the Shuttle doesn't it? Bill Parker W8DMR recommended it 2-years ago at our Dayton ATV WORKSHOP conferences and explained (to those who would listen) in great technical detail (by slide show) just why FM would work better. Josef Grimm DJ6PI published length dissertations comparing AM to an FM TV Signal in VHF Communications (3/86) and in our own USATVS Journal 3-years ago (SEP 1988). The British Amateur TV Group endorses FM. The Germans use FM just about exclusively. French FM TV is renown for it's excellent quality. Therefore, the USATVS recommends and promotes FM experimentation here in the USA as well. Two USA manufacturers; Don Miller W9NTP and Steve Franklin WBSKGL are believers that FM TV is superior in performance. Bruce Brown WA9GVK, Dave Williams WB0ZJP and others around the country have been using FM-TV for sometime now and I bet they hate to go back to looking at AM signals. There is said to be some 20 stations on-the-air using FM modulation techniques for HAM-TV (and growing). The Commercial Broadcast industry uses FM on their local links, up/downlinks. Satellite TV industry people use FM. The Military uses FM. The U.S. Government and even NASA uses exclusively FM. Why then, especially on an UPLINK only space experiment was it necessary to use AM TV? What does it really prove to have to use 60,000 radiated watts of ERP to get a decent picture to a relatively nearby overhead shuttle? Shouldn't FM have been given a chance in a side-by-side comparison? Can't we do more serious radio and TV experiments with NASA's cooperation than just have family and friends "waving hello" to each other from ground to vehicle? Will FM get an opportunity on the next space flight in a couple years? I hope so.

**POTPURRI FROM THE DAYTON FLEA MARKET...**

You must have noticed the large, multi-colored, polyurethane, BLIMP/BALLOON with streamers on it that hovered over the Dayton Flea Market. If you followed the tether line down it came down to Howard Walker's SATELLITE NEWS parking spot. Howard called a couple days after the Hamfest and is sending us an article and AD about the balloon and how it not only can be used for advertising purposes, but for HAM-TV, stringing up dipole wires for field day, for emergency setups, etc. Bill Brown brought over a UNIDEN camera and transmitter on Saturday or Sunday I guess and they were sending pictures of the vast crowd below. 439.250 MHz operation however, interfered with a number of 440 FM people and many voiced opposition to the flight. Gee, can't they take a joke? You can buy these mini-blimps. Look for an AD on this within this issue and watch the "QSO Amateur Radio" Satellite downlink for a videotape program on these nifty devices soon to air.

We've got something cooking with Larry Scott, President/GM of KJD Teleproductions in Voorhees, NJ that will be of interest to Fast Scanners. Larry and I got together and worked out a deal on providing 30 minute VHS format videotapes with CUSTOMIZED special effect callsign and location ID's and colorbars on it! Imagine each letter of your HAM call rotating, flipping and zooming out at you - one by one - just like at the movies! Would you like NTSC colorbars with your name, callsign and location on it? Look for KJD Teleproductions 1/2 page AD elsewhere in this issue.

**WELCOME JOHN LUTZ N9JL TO COLUMN STAFF!**

I'd like to officially welcome John P. Lutz N9JL of Rolling Meadows, IL to our fine growing staff of column editor writer's! John was giving some serious expressed thought to publishing a special newsletter devoted to BALLOON LAUNCH EXPERIMENTATION. I offered him some regular "paid" SPEC-COM column space in our "FROM THE WORKBENCH" regular column started for us by Steve Franklin WBSKGL. John is a real builder and experimenter. Look for other interesting things besides balloon watching as well. He had submitted several technical manuscripts to one of the major Ham magazines for publication but has been very disappointed not seeing anything happen with it. So, we said we would print them and John has now provided us with some great stuff for future issues! There is a definite need for a much more detailed transcript of BALLOON assembly and operations AND SPEC-COM IS GOING TO PROVIDE IT! This and future issues will give details on DRIFTER 1 System, Reception Reports, Discussion of Lithium Cells, T.C. CW ID/Message Board, Installing LORAN receivers, Time versus Temperature Charts, 10 Meter CW Transmitter Building Project and other interesting data (Hey Ralph Wilson WB0ESF - How about a #116 ATV BALLOON LAUNCH new booklet)? "Go get 'em John"! This column is your vehicle to reach out and dazzle a captive audience.

**UNSLICED PAGES ON YOUR ISSUES?**

I have been finding that some of the issues we have been distributing have improperly cut page problems. Have you got some of these issues? Usually, it is the top portion of the newsprint pages that are not trimmed properly by our printers. They are murder to try and correct. If you received any of these issues, call or write and tell us and we will send you another. The little tear-pull holes on some issues at the bottom of some pages near the center section of some issues is caused from a machine that pulls the pages through the press during the folding and stitching process. Each issue that we print keeps getting better and better. Thanks for your patience.

**ARE YOU READY FOR SUMMERTIME DX?**

Here in the midwest, you'll be able to work 2 FSTV DX contests at the same time! The USATVS & Indiana Amateur TV & UHF Club are working "together" this year to overlap mutual contest dates. Indiana: Aug 1 thru Sep 15th. USATVS: during the week Aug 19-25th.

**STS-37 GAMMA RAY/FSTV UPLINK FLIGHT!**

Included in this issue, is a FULL report (not just NASA and AMSAT material cutouts) on how the fellas at Marshall Space Flight Center Amateur Radio Club "worked" Ken (is your) Cameron (great nickname eh?) onboard the Atlantis during the first week of April! The guys came up to Dayton and presented a nifty videotape showing their setup, a 300 watt Motorola Amplifier donated by N9AB that bit the dust at the last second and how they scrambled to recuperate it and actual first contact with the Shuttle on ORBIT 6. Thanks to the Marshall TEAM for sharing the tape and the article with us all! Did you all see the new Shuttle "Endeavor" take to the sky piggyback on a 747 from California the other day?

**"See you on the tube..." -WB0QCD**

## "CLUBS, CONTESTS and SPECIAL EVENTS!"

Report filed by:

Dale Lam - WA0NKE  
5045 N. Kensington Av.  
Kansas City, Mo. 64119

Pictured right: ARRL Life Member WA0NKE and his modern ATV station setup including Weather Radar.



### USATVS SPRING QSO PARTY EXPERIENCE

The first annual USATVS/SPEC-COM ATV QSO PARTY is over and I sure had my share of the fun. I didn't see any ATV DX during the contest period, but that has been typical of the last several months. I don't think very many of the participants sent in contest logs from this area, though some of us were able to get as many as 19 reports and 2-way QSO's. The 1st of two annual sponsored USATVS contests did generate extra ATV activity, and it was great seeing the family members and other friends on the TV. No one tried to get points with snakes or ants, but I saw lots of computer fish and other computer animals. Some people will try to sneak past any rule. (Chuckle, chuckle.) I am very proud to say that each and every bonus point that I claimed was alive and in person, and a willing participant. Some of the guys were planning to take their mobile ATV to the St. Patrick's Day Parade. Fortunately, for the rest of us, they didn't think about it until it was too late. Can you imagine each QSO being worth about 20,000 points or so? There were less than a dozen LOGS submitted to the USATVS from across the country demonstrating a much larger participation in the annual AUGUST DX contest. This is a bit embarrassing, but WB0QCD informs me that "I" took FIRST PLACE HONORS in the event! My mailed in logsheet tallied 18 contacts for a total score of 4,345 points. Kevin Connell N0DYM, also of the KC ATV Group, took 2nd place honors with 19 contacts and 2,980 points. Some K-CAT's in the Bakersfield southern California area entered this year and swept 3rd, 4th and 5th place honors. They are: 3rd N6TFO, CA with 1,030 total points, 4th Steve KC6KGE (also of K-CAT) with 980 points and 5th Rob KB6JFL with 630 points! K-CAT stands for Kern County Amateur Television. They are a new ATV Club with just 4 members and 5 watchers. The group would like to hear from other Bakersfield HAM TV operators or interested hobbyists. Recently, they set up a FSTV pre-event test run from an empty parking lot (using a lawnchair for a forgotten to bring TRIPOD) that attracted a lot of curious onlookers including THE POLICE! A "short" was found in the 100' coaxial line between the antenna and the car (yes 100'!). Everyone gathers at the local RADIO SHACK STORE (#01-3548) in Bakersfield (6007 Niles) since it is managed by a Ham (805) 366-9008. Thanks for entering guys! Certificates are on the way to ALL who sent in logs.

### UPCOMING CONTESTS and SPECIAL EVENTS

There are several ATV/Packet Balloon launches this summer. Houston and Denver just launched theirs I understand. I have word that the USATVS/SPEC-COM Journal sponsored, National annual SUMMERTIME FSTV-DX Contest will be during the week of AUGUST 19th thru the 25th 1991. This will be great for us here in the midwest as The 1991 annual INDIANA ATV CONTEST runs also during that period! Their event begins at 0500 UTC on August 1st and runs to 0500 UTC on September 15th 1991. The OBJECT is to work as many FSTV stations as possible on 420 MHz and above. There are four POWER CLASS categories: Class I: less than 5 watts, II: 5-34.9 watts, III: 35-99.9 watts and IV: 100 watts or more (P.E.P.). Only confirmed 2-way contacts count of 10 miles or more range. No repeater, balloon or airborne contacts allowed. Contacts must be confirmed by QSL cards or snap shot including location, P-signal report level, mileage, power used, UTC contact time and frequency/band. Please provide LAT/LONG of your operating station with logged entries. SCORING for the INDY contest is as follows: 1 point for each statute mile. The same station may be worked more than once on other bands. All entries must be post-marked no later than October 15th 1991 and sent to: Chuck Crist WB9IHS, 6455 Madison Avenue, Indianapolis, IN 46227. Include a home phone number. Contest log sheets are available at this address. For a full flyer of details on this special event, send an SASE to WB9IHS.

### "UPCOMING SPECIAL EVENTS!"

JUNE 15TH  
W6BHZ Balloon - Edwards AFB, CA

Live morning launch with FSTV camera on 434 MHz, vertically polarized. 2 Meter FM Packet Radio telemetry downlink. Student engineering experiment sponsored by the Society for Women Engineers from Cal Poly University in San Luis Obispo. A large sounding balloon (RAVEN 19k cu. ft.) will lift an atmospheric sampling apparatus up to 80,000. HF NET on 7.243 MHz. For more information, contact David Fichou KB6OEN at (805) 546-9369.

JUNE 29TH  
W8BI Balloon Launch - Dayton, Ohio

Live camera on FSTV at 439.250 MHz using horizontal polarization. 2 Meter voice ID on 144.340 MHz, 20 Meter CW xmtr on 14.035 MHz. 9:30 am EDT launch time. Sponsored by the Dayton Amateur Radio Association (DARA). Launch site near Huber Heights. HF NET 40 Meters on 7.232 MHz starting at 7:30 am. For more information see description in separate article elsewhere in this issue or contact: DARA W8BI, PO Box 44, Dayton, OH 45401-0044.

JULY  
Central States VHF/UHF Conference  
Sheraton Inn - July 25th - 28th 1991

One of the most respected, technical and prestigious events in the country! This year returning to Cedar Rapids, IA. 2 Meter SSB, 220, 432, 900, 1200 MHz and above talks & lectures. EME, Packet and OSCAR. ATV included. Special Preamp & Antenna Measurement Contest! A number of FSTV type antennas will be entered by the USATVS.

JULY OR AUGUST  
W0RPK Balloon - Des Moines, IA

ATV? Packet robot system will relay telemetry on 2 Meter FM. Down-link frequency is 145.55 MHz and uplink on 144.95 MHz. Telemetry includes: inside/outside temp., atmospheric pressure, LAT/LONG (onboard LORAN C receiver) Fall 1991 flights planned carrying school experiments. Contact Ralph Wallio W0RPK, 1250 Hwy G-24, Indianola, IA 50125. Packet messages: W0RPK @ W0AK.IA

AUGUST 25th  
HAMCAM - Marysville, OH Hamfest

Several ATV forums and demonstrations will be featured this year at Marysville, OH (near Columbus). The world famous "HAMCAM" ATV van will be on display and in operation. Huge flea market.

SEPTEMBER 14TH & 15TH  
Peoria, IL SUPERFEST!

## THE BEST MONEY MAKING IDEA FOR YOUR CLUB

Last issue I talked about some money making ideas for clubs. I've been thinking about it some more, and the best idea that I know is to sell or raffle an ATV downconverter. This may not generate the greatest amount of money, but it can bring in money above its cost, and it has other benefits also. The side benefits are: that it gets another person started in ATV, and it can be used to generate lots of interest in the club. Everyone likes to get something for nothing. Winning a raffle provides a means to the goal. Your club could get a downconverter from one of the manufacturers at a reduced price and sell tickets to club members and others interested in ATV. This is very easy to do at a hamfest, it's like being eligible for another door prize and the cost to the participant is minimal. At our local hamfest we have about 2500 in attendance each year. Most of these people eventually walk by the ATV Club booth. They are able to see live ATV demos and talk with active ATV'ers about what it takes to get on the air, etc. Almost everyone would like to try ATV, but they aren't willing to part with any money to do it. The raffle is a way to get started for only \$1 and some good luck. Last year our club used one of the PC Electronics downconverters. This year we are using one from TD Systems and next year we'll get another one from somewhere else. It provides the club with the previously stated benefits, but it also gives the manufacturer big benefits, so you needn't pay full price for it. You will show that piece of equipment to everyone who stops by your booth (in our case about 3000 people). You will probably find that you could sell it a dozen times during the hamfest, so that generates at least a few sales for the manufacturer that he didn't have before. If the equipment is new and none of the local ATV'ers have seen it, you are providing a super showcase for the company, and a service for the local boys who may only have seen it in the magazines. Most people in the Kansas City area want a downconverter to enable them to see the weather radar that we transmit continuously over our 70 cm ATV repeater. The radar has been the single most important feature provided by amateur television in our area. We get lots of storms each year and absolutely everyone wants to see the storms coming. Several counties around this area have Civil Defense and ARES groups that use the ATV weather radar for the Storm Watch activities. This makes for lots of requests for downconverters at the hamfest. An almost free downconverter is desired by everyone. Give it a try.

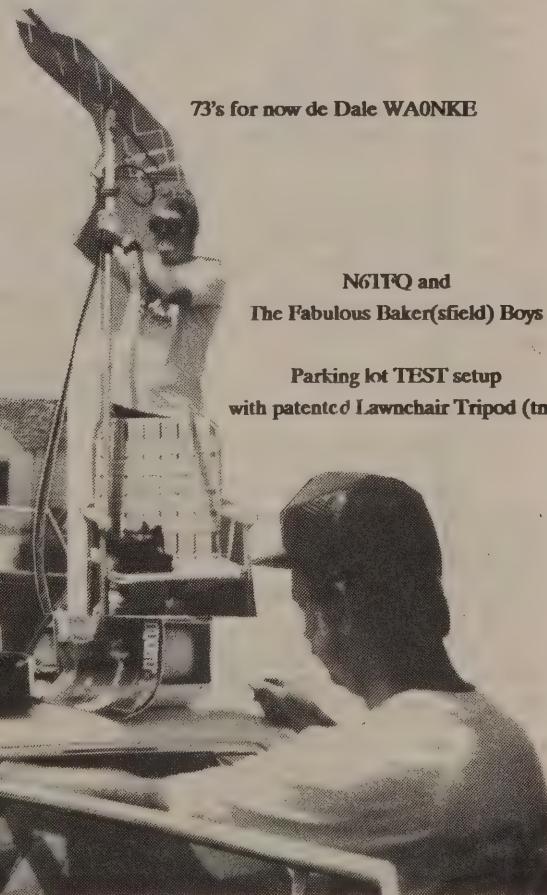
## THE CLUB BOOTH AT THE HAMFEST

If your club is needing members and you want to advertise your club activities, try having a club booth at the local hamfest. It should be more than just a club swap table. It is a special opportunity for your club to "strut its stuff". Show the other groups what your club does. Talk to all the hamfest participants about your club and why they would enjoy being apart of it. Think of some ways to show club spirit. One great way is to have a club "T-shirt" with your logo or club name embossed on it. Have everyone who works behind the table at the booth wear one. It will show solidarity among members and demonstrate their enthusiasm. Have an artistic member of the club make a nice sign with the club logo on it, and hang it up for all to see. It will immediately identify your booth and your group. One of the members of our ATV club produced an animated

computed sequence of the club logo. It is well done, shows great creativity, and we always have it running continuously at our booth. It draws lots of attention to the booth and provides another opportunity to engage people in a discussion about the club. Have several different kinds of live ATV demonstrations going on. This will let you show what ATV can do and show how to do it. Lots of newcomers haven't seen any ATV equipment, and they may not have any idea how well it can work or what equipment is needed. You could try setting up a cross band full duplex TX/RX from your booth to another important location in the hall or even into the local ATV repeater. Show the live weather radar if it is available. Be sure to show NASA SELECT TV if a space shuttle is in orbit. A good alternative, if you can't have these things live, is to have several video tapes running simultaneously into separate monitors. Show video of your special activities: balloon launches, club picnics, etc. The more you can show, the easier it is to convince people that your club is an interesting group to be associated with. Each club should have some kind of one sheet handout that lists the important things that the club does during the year. You might be surprised at how many people don't know what your club activities are. This handout paper is your "brag sheet" and a basic introduction to others about the club. It should also include the club mailing address and the telephone number of a volunteer who will be able to tell callers when and where the next club meeting will be. These and other ideas can make it fun for you to take your message to other interested persons. Now that we have the codeless technician license, your interesting amateur radio and ATV display can attract more new hams when coupled with license information. I would like to hear about your success stories with public demos.

## HAWAII TO USA FSTV ATTEMPT THIS SUMMER!

Paul Leib KH8HME on the big island of Hawaii, has been successfully sending 144.170 MHz and 432.074 CW signals (60 watts) across the Pacific into Southern California for some time now. He has now erected an ATV camera & remote transmitter system (PCE and MIRAGE D1010N/R) at the 8,200 foot level of an active Volcano - Mauna Loa. 4-KIFO-22 element beams are phased and pointed east for big-time ERP! Horizontal polarization is used for ATV activity in Hawaii. Several West Coast Amateurs are now setting up gear to "watch" for possible FSTV images during June, July and August on what would be a RECORD DX contact over the 2,500 mile water path! For more information on this special event, contact Gordon West WB6NOA at 2414 College Drive in Costa Mesa, CA 92626.



N6ITQ and  
The Fabulous Baker(sfield) Boys

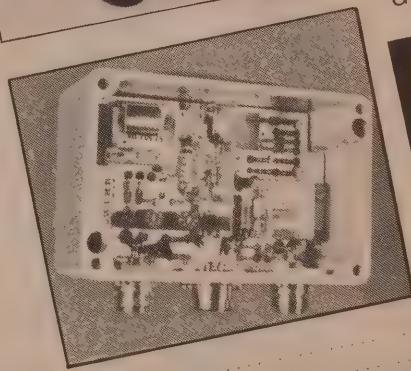
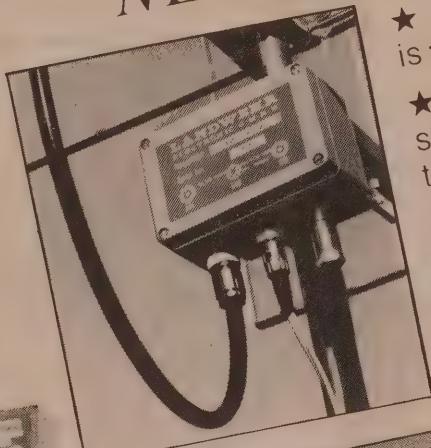
Parking lot TEST setup  
with patentd Lawnchair Tripod (tm)



# THIS IS IT!

...an affordable high  
quality masthead  
preamplifier

HEAR SIGNALS THAT YOU'VE  
NEVER HEARD BEFORE



## SPECIFICATIONS

Frequency Range	145-432 MHz
Noise Figure	144-148 MHz
N GAS xxx MA	F < 0.7 db
Gain	typ. 0.6 db
Maximum Switchable Power (PEP) VOX Operation	18-20 db
Maximum Transfer Power (PEP) PTT Operation	150 Watt
Connector	750 Watt

the Landwehr masthead preamplifier, available only from Henry Radio  
...in fact, we have it all! We are OSCAR specialists. henry Radio leads the way. Let us  
answer your questions and help you with your needs. Give us a call — ask for Jack (WA6VGS).

Now available...  
three models!

145 MHz	220MHz	432 MHz
---------	--------	---------

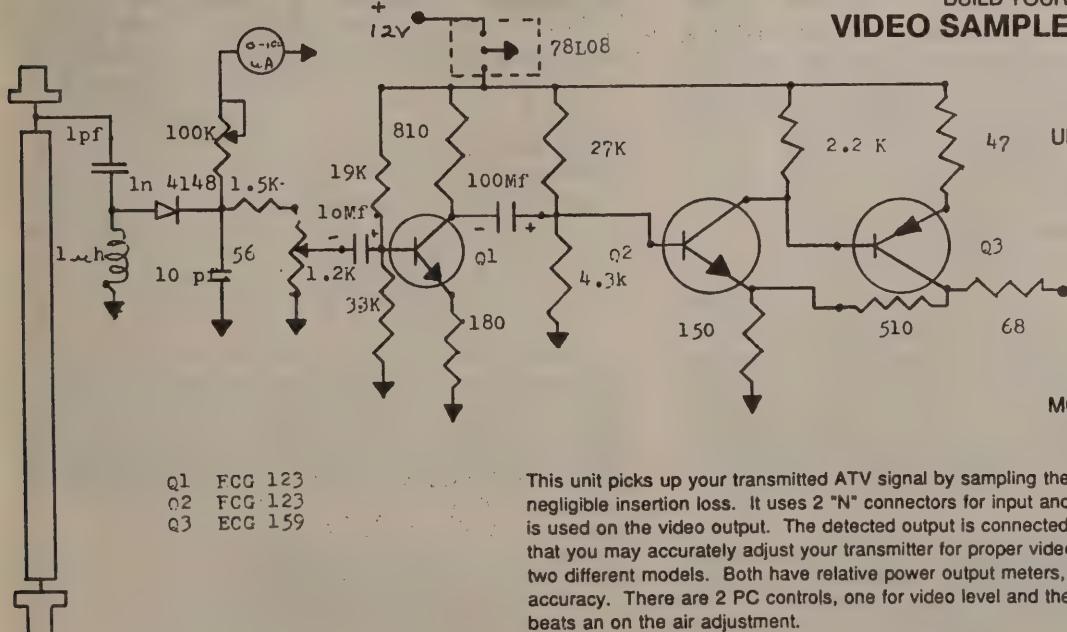
145 MHz	432 MHz
144-148 MHz	430-450 MHz
F < 1.1 db	F < 1.1 db
typ. 0.9 db	typ. 0.9 db
17-19 db	17-19 db
150 Watt	150 Watt
350 Watt	350 Watt
Type N	Type N

Henry Radio

2050 S. BUNDY DR. LOS ANGELES, CA 90025 (213) 820-1234  
Toll free order number: (800) 877-7979 TELEX: 67-3625(Henradio)  
FAX(213)826-7790



### BUILD YOUR OWN VIDEO SAMPLER CIRCUIT



A REVIEW OF THIS UNIT WAS PRESENTED IN THE MAR/APR '91 ISSUE OF SPEC-COM Journal (page 41)

MODEL PD-VD-1

Q1 FCG 123  
Q2 FCG 123  
Q3 ECG 159

This unit picks up your transmitted ATV signal by sampling the transmission line with negligible insertion loss. It uses 2 "N" connectors for input and output connections. A BNC is used on the video output. The detected output is connected to your monitor and scope so that you may accurately adjust your transmitter for proper video & sync levels. We provide two different models. Both have relative power output meters, but one has a greater accuracy. There are 2 PC controls, one for video level and the other for power output. This beats an on the air adjustment.

"Watch for other useful Amateur Radio Circuit Designs and Electronic Schematics courtesy of Don Fuller W2WHK of PAULDON ASSOCIATES to appear here, in THE SPEC-COM JOURNAL, on a regular basis!"

(C) 1991 SPEC-COM Communications Ltd. &

**pauldon**  
ASSOCIATES

# Fast Forward Video

## Video and TV Questions/Answers

with RON HRANAC NØIVN  
WESTERN VISION ATV NETWORK  
466 Pluto Court, Littleton, CO. 80124

I'm all packed and on my way to CHINA! Here are some mathematical formulas and equations for POWER CONVERSION to keep you all busy while I am away! Sorry I will miss you guys at Dayton. -NØIVN

Q - I have always measured transmitter power in watts, yet things like gain and loss are usually stated in decibels. Occasionally I even see power levels in decibels. How can I easily correlate watts and dB?

**A-** It's best to think of decibels (abbreviated dB) as a shorthand method of dealing with numbers. By itself, the decibel can only express a ratio between two values, although when coupled to a reference can express absolute values (in the latter case, the expression is actually a ratio to the reference).

It might surprise you to learn that the decibel had its origins in the telephone industry. In the early part of the century, engineers discovered that a 10-mile length of a certain type of telephone cable attenuated the *power* of a signal by a fixed amount. They named that fixed amount of power loss the *bel*, in honor of Alexander Graham Bell. Mathematically the loss was determined to be the base 10 logarithm of the *ratio* of the telephone cable's output power to its input power:

$$\text{bel} = \text{LOG}(P_1/P_2)$$

where  $P_2$  was the signal power at the output of the telephone cable, and  $P_1$  was the signal power at the input to the cable (both power levels are in the same units). But like trying to use the Farad to measure capacitance, the bel was very cumbersome to deal with--especially on much shorter lengths of cable--so they divided everything by 10 and came up with the decibel (one-tenth of a bel). The decibel could then be described mathematically as:

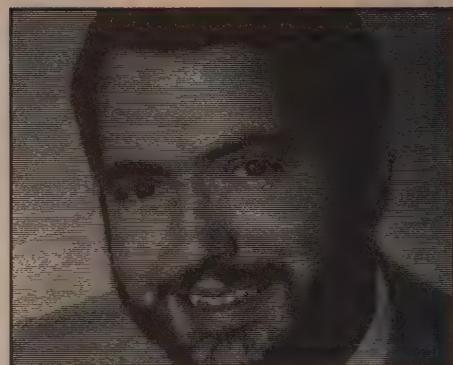
$$\text{decibel} = 10 * \text{LOG}(P_1/P_2)$$

Since the decibel expresses a ratio between two power levels, it follows that it is ideal for such things as gain and loss. Thus, comparing a device's output power to its input power becomes fairly easy when using decibels. After all, isn't a whole lot easier to say "the loss through a filter is 3 dB" instead of saying "the loss through a filter is 50 watts if the input is 100 watts," or "...10 watts if the input is 20 watts," etc.?

Example: Your transmitter output is 100 watts, and your friend's transmitter output is 50 watts. How much more power does your rig have, in decibels, than your friend's?

Solution:

$$\begin{aligned}\text{decibel} &= 10 * \text{LOG}(P_1/P_2) \\ &= 10 * \text{LOG}(100/50) \\ &= 10 * \text{LOG}(2) \\ &= 10 * 0.30103 \\ &= 3.01 \text{ dB}\end{aligned}$$



Ron Hranac

From this example, whenever the ratio of two power levels is *two*, the difference between them will always be 3 dB (actually 3.01 dB). It doesn't matter what the original power levels are; we are dealing with *ratios* between those power levels! If one transmitter is 1,500 watts and the other is 75 watts, or if one is 20 milliwatts and the other is 10 milliwatts, the difference is still 3 dB.

Look at it another way: If you have a 100 foot piece of coax whose loss is 3 dB at a certain frequency, the output power on that frequency at the far end of the coax will always be half as much as the input power (assuming no impedance mismatches or VSWR problems). If the input is 1 watt the output will be 0.5 watt; if the input to the same coax is 10 watts the output will be 50 watts, and so on. By the way, the rule of thumb that I've mentioned in this column before still holds: a 3 dB (actually 3.01 dB) change means that the power level has either doubled or been reduced by half. A change of 10 dB means that the power level has increased 10 times or has been reduced to one-tenth of its original value.

Here's another example: What is the gain of a linear amplifier that requires 75 watts drive to produce 1,500 watts output?

Solution:

$$\begin{aligned}\text{decibel} &= 10 * \text{LOG}(P_1/P_2) \\ &= 10 * \text{LOG}(1,500/75) \\ &= 10 * \text{LOG}(20) \\ &= 10 * 1.30103 \\ &= 13.01 \text{ dB}\end{aligned}$$

Before going on, let's try one more example: If you measure 110 watts at your rig's output in the shack and 72 watts at the other end of the coax feeding the antenna, what is the loss between your rig and the antenna? (Again assume there are no impedance mismatches or VSWR problems.)

Solution:

$$\begin{aligned}\text{decibel} &= 10 * \text{LOG}(P_1/P_2) \\ &= 10 * \text{LOG}(110/72) \\ &= 10 * \text{LOG}(1.52778) \\ &= 10 * 0.18406 \\ &= 1.84 \text{ dB}\end{aligned}$$

Since most received signal strength meters are calibrated so that each S Unit is about 6 dB, that loss of 1.84 dB between your rig and your antenna will barely be noticeable (if it is at all) to the station at the other end of your QSO, since

represents less than one third of a single S Unit. (One exception might be in EME or similar weak-signal work, where the signals are very close to or actually buried in the noise.)

Now that we've covered power ratios and their relationship to decibels, let's move on to expressing absolute values using decibels. You may have seen terms such as +30 dBm, -10 dBm, etc. They refer to discreet power levels (+30 dBm = 1 watt and -10 dBm = 0.0001 watt), although to be more accurate, they are ratios to a specific reference.

In the case of dBm, the reference is 1 milliwatt; that is, 0 dBm equals 1 milliwatt. Thus, when we say +30 dBm = 1 watt, we are actually saying that 1 watt is 30 dB greater than our 1 milliwatt reference. Likewise, -10 dBm means that 0.0001 watt is 10 dB less than the 1 milliwatt reference (hmmm...ratios again!). You can convert from milliwatts to dBm using the formula:

$$\text{dBm} = 10 * \text{LOG}(\text{milliwatts})$$

Here's an example: Your ATV exciter's RF output is 100 milliwatts. What is that level in dBm?

Solution:

$$\begin{aligned}\text{dBm} &= 10 * \text{LOG}(\text{milliwatts}) \\ &= 10 * \text{LOG}(100) \\ &= 10 * 2 \\ &= 20 \text{ dBm}\end{aligned}$$

If the original power level you are dealing with is in watts, simply multiply by 1,000 to convert from watts to milliwatts. Here's another example: Your ATV transmitter output is 1.25 watts on sync tips. What's that power in dBm?

Solution:

First convert 1.25 watts to milliwatts by multiplying by 1,000 ( $1.25 * 1,000 = 1,250$  milliwatts).

$$\begin{aligned}\text{dBm} &= 10 * \text{LOG}(\text{milliwatts}) \\ &= 10 * \text{LOG}(1,250) \\ &= 10 * 3.09691 \\ &= 30.97 \text{ dBm}\end{aligned}$$

To go the other direction and convert from dBm to milliwatts, use the formula:

$$\text{milliwatts} = \text{INV LOG}(\text{dBm}/10)$$

or

$$\text{milliwatts} = 10^{(\text{dBm}/10)}$$

Let's say the output of your exciter is +13 dBm. What is that level in milliwatts?

Solution:

$$\begin{aligned}\text{milliwatts} &= \text{INV LOG}(\text{dBm}/10) \\ &= \text{INV LOG}(13/10) \\ &= \text{INV LOG}(1.3) \\ &= 19.95 \text{ mW}\end{aligned}$$

OK, now let's put all of this into practice...

Your 439.25 MHz ATV amplifier's output is 35 watts (sync tips), and the coax loss between the shack and antenna is

3 dB. Your 16 element Yagi has 14.1 dBd gain. Assume you want to contact another ATVer 15 miles away; his 10 element Yagi has 11 dBd gain, he's not using a preamp, and his download loss is 2 dB. What's your effective radiated power in watts, and what is the input to his receiver in dBm and microvolts?

Solution:

The first thing to do is convert your transmitter output power to milliwatts by multiplying it by 1,000 ( $35 * 1,000 = 35,000$  mW), then to dBm using the formula

$$\begin{aligned}\text{dBm} &= 10 * \text{LOG}(\text{milliwatts}) \\ &= 10 * \text{LOG}(35,000) \\ &= 10 * 4.544068 \\ &= 45.44 \text{ dBm}\end{aligned}$$

Now sum your transmit coax loss and antenna gain (in dBi, not dBd; to convert antenna gain from dBd to dBi, add 2.14 to the dBd value):  $45.44 + (-3) + 16.24 = 58.68$  dBm. This figure is your effective radiated power, which now must be converted to watts:

$$\begin{aligned}\text{milliwatts} &= \text{INV LOG}(\text{dBm}/10) \\ &= \text{INV LOG}(58.68/10) \\ &= \text{INV LOG}(5.868) \\ &= 738,019.85 \text{ mW, or 738 watts}\end{aligned}$$

We've solved the first part of the problem: Your effective radiated power is 738 watts. To solve the remainder of the problem, the path loss has to be calculated using a formula that was discussed in this column in the March/April issue of *SPEC-COM* (I've added some extra parentheses to simplify it a bit):

$$A_{\text{db}} = 36.6 + (20 * \text{LOG}(F)) + (20 * \text{LOG}(D))$$

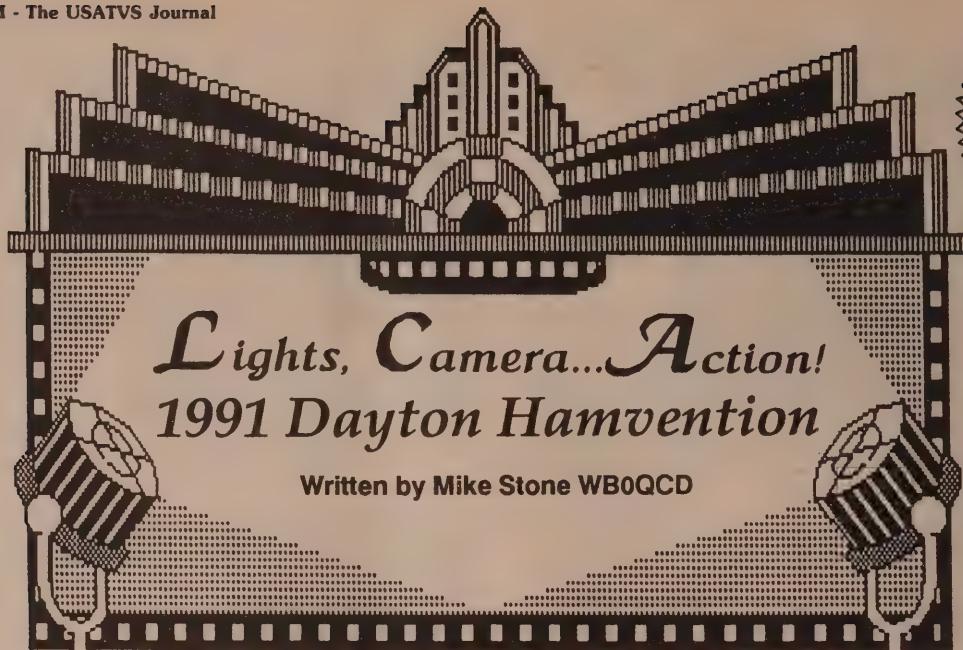
where  $A_{\text{db}}$  is the path loss in dB, F is the frequency in MHz, and D is the path distance in statute miles.

$$\begin{aligned}A_{\text{db}} &= 36.6 + (20 * \text{LOG}(439.25)) + (20 * \text{LOG}(15)) \\ &= 36.6 + (20 * 2.6427) + (20 * 1.1761) \\ &= 36.6 + 52.85 + 23.52 \\ &= 112.97 \text{ dB}\end{aligned}$$

We can now calculate the input to the receiver:  $45.44$  dBm (transmitter output) - 3 dB (transmit coax loss) + 16.24 dB (transmit antenna gain) - 112.97 dB (path loss) + 13.14 dB (receive antenna gain) - 2 dB (receive coax loss) = -43.15 dBm. To calculate the receiver input in microvolts, first convert the dBm input level to watts:

$$\begin{aligned}\text{milliwatts} &= \text{INV LOG}(\text{dBm}/10) \\ &= \text{INV LOG}(-43.15/10) \\ &= \text{INV LOG}(-4.315) \\ &= 0.000048417 \text{ mW, or} \\ &0.00000048417 \text{ watts}\end{aligned}$$

Using Ohm's Law ( $E = \sqrt{PR}$ ) and assuming a 50 ohm impedance for R, the receiver input voltage is 0.0015549 volt, or 1554.9 microvolts.



#### 40TH ANNUAL EVENT!

The 1991 Dayton, Ohio Hamvention is now history. Celebrating the 40th anniversary of the annual gathering of Radio Amateurs from all over the world, a record number paid turnout of 32,716 and a guess of 35,000 (including dealers, exhibitors, guests, speakers, etc.) were on hand for the 3-day extravaganza. More than \$110,000 worth in prizes were donated and given away to lucky stub holders. General Chairman Ross Brown WA8DQH commented in an interview after the event, that the Hamfest was 12% larger than last year. The Dayton Hamvention is sponsored each year by The Dayton Amateur Radio Association.

The first Hamvention took place in 1951 and was held at the Dayton Biltmore hotel. Only 300-600 showed up and there were six forums on the agenda. Today, the Dayton Hamvention hosts 300 plus exhibitors and 51 official forums. Many hotels run their own special "forums and conferences" after the show is over each night. In 1964, the Hamvention moved to Hara Arena where it has been held ever since. 2,200 flea market spaces were available (sold out in February) spread out covering some 25 acres of land! Well organized city and private buses at the Hamvention shuttle Hams back and forth to all the cities hotels and motels. 1300 people attended the Hamvention Banquet at the downtown Dayton Convention Center on Saturday evening. 1985 USATVS "Ham of the Year" and retired NASA Astronaut Dr. Tony England W0ORE, was guest speaker talking about how it was aboard Space Shuttle Flight 51H. Roy Neal K6DUE interviewed NASA Astronaut Ken Cameron KB5AWP who just returned from space aboard the Shuttle Atlantis (see story elsewhere in this issue) on STS-37. Amateur of the Year honors went to FCC's John B. Johnston W3BE for his two decades of outstanding public service to the amateur radio community. Nate Brightman K6OSC got the Dayton Special Achievement Award for establishing a Ham station onboard the Queen Mary ocean liner (tourist attraction) now docked in Long Beach, CA. Lou McFadin W5DID accepted the Technical Excellence tribute for his fine work at Johnson SFC interfacing Ham Radio equipment aboard Space Shuttles.

Quarter Century Wireless Association (QCWA) officials Lew McCoy W1ICP and General Manager Ted Heithecker W5EJ were getting a lot of "pats on the back" for getting the FCC to go with their "NO CODE" proposal. Ron Wright N9EE of MICRO COMPUTER CONCEPTS Company from Dayton, was voted the 1991 USATVS/SPEC-COM "Technical Achievement Award" winner Sunday morning at the Ramada FSTV DX'ers Breakfast. He was recognized for his design, engineering, commercial construction and marketing his company's new 10-channel VC-100 Video Controller/Switcher system. Ron's inventive effort will revolutionize new and existing Amateur TV Remote Transmitter Systems throughout North America. Mel Dunbrack W1BHD, longtime member of ECATS, now residing in Malden, MA (who could not attend due to health reasons) was announced as the 1991 USATVS/SPEC-COM "GOOD IMAGE" Award Winner Friday Night at the "Early TV & Radio Conference". Mel has been tinkering with HAM-TV, radio, facsimile and satellites since the early 1920's. Congratulations Ron and Mel on your well deserved awards! Wall plaques are coming shortly.

#### RAMADA INN NORTH 6th ANNUAL WORKSHOP SESSIONS

17 out of 18 planned speakers showed up and lectured at t 2-night, USATVS/SPEC-COM Journal "Specialized Communicati Mode" WORKSHOP sessions. Speakers included;

#### USATVS ATV WORKSHOP SESSION #1

Special "Early TV & Radio Nostalgia" Night  
Friday - April 26th 1991

Mike Donovan KA0JAW assisted me in MC'ing both the Friday and Saturday night Workshop sessions.

**Ken McIntosh - Baltimore, MD.** - Ken's collection of Early TV equipment is one of the best in the country! The New York Broadway Museum and The Smithsonian Institute in Washington, D.C. thought so and acquired his collection of 29 pieces and displayed them in with a special "50 YEARS OF TV" exhibition last year! Ken's VIDEOTAPED program entitled "ORIGIN OF TELEVISION" which shows his exhaustive research into the subject as well as his personal collection was presented.

**Gerald Cromer K4NHN - Cayce, South Carolina** - Gerald has turned into a new Antique Radio Collector buff. He is a longtime employee (transmitter technician) for The South Carolina Educational Television System (PBS) Network and has been on HAM-TV for 15 years. Gerald attended Dayton this year but was fighting off a bad cold and rather than speak in front of the Ramada crowd, he submitted a videotape presentation of his collection.

**Peter Yanczer KOIWX - St. Louis, MO.** - Peter Yanczer, author of THE MECHANICS OF TELEVISION book, TELSA Publications is very well known and respected around the country for putting on one of the best "Early Mechanical TV" talks and actual demonstrations! He and his lovely wife displayed and demonstrated actual 1920-1930 era TV transmission equipment including Scanning Disk and Mirror Image Projection Systems. He also brought one of the "original" FELIX the CAT dolls used by early commercial broadcasters!

**Dave Johnson - Berwyn, Illinois** - Dave has over 50 Antique Television systems to his own personal collection and is building a special display of some of this gear in an Antique Museum in the Chicago area. He is a commercial radio professional and President of a large Antique Radio & TV Club Chapter in Illinois. Dave showed (via VCR tape) his Early TV collection and did actual demonstrations of a refurbished, mechanical (after NTSC) Field Sequential COLOR WHEEL system that turns black/white images into color back in 1955. This equipment and the quality of picture astounded everyone! seeing!

**James T. Hawes KB9EPQ - Skokie, Illinois** - Jim Hawes, SPEC-COM Journal's new "Early TV & Radio" columnist went on early. He is an avid collector and student of Antique Radio & TV equipment and operating

practices. As a technical writer, Jim has attained a wealth of knowledge about the subject and is even writing a new book about it. He spoke about "Chicago Television Wunderkind Ulises Sanabria, And The Inventor In All Of Us..." He narrated a neat slide show presentation also.

**Jerald Hueber - Antique Radio Collectors of Ohio** Rounding up the evening - 4 local Dayton Club speakers & exhibitors of Antique Radio gear: Jerald Hueber, Karl Koogler, Jim Cross and Don Joyce enlightened us with some history of the RADIO and the associated era followed by an open question and answer session. Several Antique Radios were brought in for display!

## USATVS ATV WORKSHOP SESSION #2

ATV/SPACE/WEFAX Technical Seminars  
Saturday - April 27th 1991

**Open ATV Videotape Presentations** - VHS videotapes were shown of local FSTV activities, repeater and special events. New equipment was on display. Bill Bryant K9KBL of Springfield, IL. won the homebrew equipment award for a submitted PCE ATV transceiver "kit".

**Mike Stone WB0QCD - Clarence, Iowa** The Importance of The USATVS National ATV Repeater & Remote Transmitter Databases.

**Dr. Al Chandler K6RFK of AEA Corp. Lynnwood, WA.** - Al showed us and passed around the NEW AEA VSB-70 ATV Transceiver and other products! He took questions on Vestigial Sideband Filtering.

**Steve Franklin WB5KGL - T.D. Systems, Pantego, Texas** - Improving the State of Art & Design on Amateur FSTV Gear, On-Carrier Audio Techniques. He also talked about his new CU-100 ATV Transceiver and FM-TV.

**Dick Curtis KK4HF & Gene Marcus W3PM - Marshall Space Flight ARC - Huntsville, AL** - They talked about the recent Atlantis Space Shuttle STS-37 Mission and successful FSTV Uplink Pictures by their ARC! They talked about problems that developed with a donated 300 watt Motorola Amp and how well a Helical designed antenna worked. VCR taped footage was shown working the Shuttle from Alabama.

**Ron Wright N9EE - Dayton, Ohio - Micro Computer Concepts - VS-100** ATV Repeater & RT Video Controller/Switcher. Ron showed off the latest "single board" revision of the VC-100 video controller/switcher system.

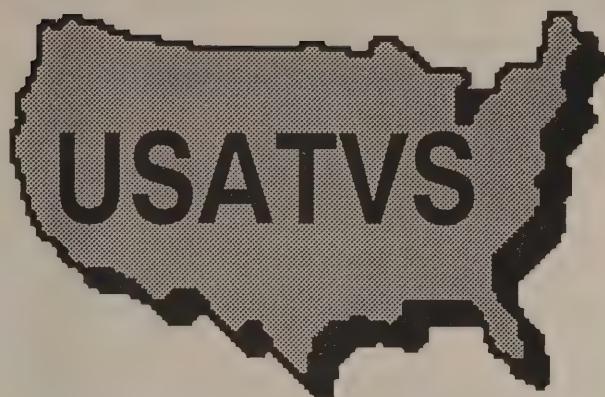
**David Schwittek NW2T - New York** - Dave unveiled his newest MULTIFAX computer software plug-in circuit for the IBM computer (and compatibles). He answered questions about the latest versions of MULTIFAX software including PRECISION interfaces.

**John Beanland G3BVU - Spectrum International - Concord, MA - New TIME-STEP Weather Facsimile System** - Always considered one our best and most interesting speakers over the years, John briefly discussed and introduced his company's new English made WEFAX RECEIVE system TIME-STEP and a Guest appearance also by TIME-STEP's UK representative.

**Don Miller W9NTP - Wyman Research - Waldron, IN. - Return Your ATV Downconverter to LSB For Less QRM** - Based on our exclusive article published in the JAN/FEB 1991 issue, Don further discussed the technical advantages and disadvantages of his idea to "get along better with nearby UHF FM/SSB mode neighbors". He also mentioned new Wyman products now available.

### RAMADA MAIN PRIZE DRAWINGS

We had scheduled for our MAIN PRIZE DRAWING of a grand new AEA VSB-70 ATV TRANSCEIVER to be done at the Sunday DXers BREAKFAST at the RAMADA but on Saturday night, we decided to followup Dr. Al Chandler's talk about new AEA equipment about an hour later with the drawing for the \$349.95 rig! One of our sexy petite "Miss A5's" (Angie) came up to the front of the room and in front of everyone that attended the Saturday night session, she drew out the winning CALLSIGN from an envelope chucked full of entries (all the CALLSIGNS received by SPEC-COM COMMUNICATIONS at our Dubuque Office are listed elsewhere in this report). As you recall, we publicized the AEA RIG CONTEST DRAWING well in advanced in several issues of The USATVS Journal asking for individuals and ATV Clubs & Groups to send in names and addresses of "active" FSTV Hams and that every callsign given to us would be entered with a ticket. We received a total of 437 entries for the event NOT including those who attended both Friday and Saturday nights WORKSHOP sessions at the RAMADA.



## The United States ATV Society

Computerized Graphic by Jim Hawes KB9EPQ

The WINNER of the AEA VSB-70 ATV RIG was: Jack Friend NOHYS, P.O. Box 1137, Independence, MO. 64051. We held other drawings for subscriptions also. Don Price KB5VP of Tulsa, OK and James Easley of Columbus, OH were the winners. We additionally gave away 3 of Peter Yanczer's "THE MECHANICS OF TV" book on Friday night (had to be present to win) whose names we unfortunately did not get for the record.

After getting back from Dayton, we had some "on-the-air" fun with NOHYS in Missouri. I called Dale Lam WA0NKE Tuesday night May 7th to inform him that the winner of our main prize was one of the Kansas City ATV Groups new members. Dale was thrilled to hear it. Together, we plotted about 9 pm. that evening for a BIG 2 Meter FM Repeater announcement. Dale MC'd the event. We got Jack on the phone at home and had him come to the repeater unaware that he had won. Dale and I "beat the bushes" radio wise and assembled a curious audience consisting of KYO W0ZGK NOAYS WR0J KG0R KA8MNI NONAP WA0NKE KA0LFT KCOWX and WR0J's Mom who tuned in on her VHF scanner! Dale relayed a few questions that I asked of Jack, one being if he had been to his post office box today? He said NO, so we knew the surprise was all set. I read over the air, a letter that Mike Donovan KA0JAW had mailed Jack which informed him that he had indeed won 1st PRIZE at our SPECIALIZED MODE CONFERENCES at the RAMADA. Jack let out a real yell of glee! As I hung up the phone with Dale, I could hear guys on the local KC machine congratulating Jack for winning. "Thanks AEA & SPEC-COM!" All together at Dayton, including books, magazines etc., we gave away over \$500.00 worth of goodies...

### OK YOU GUILTY CULPRITS... FESS UP!

Those of you who made it to the RAMADA and could get your eyeballs off our two lovely "MISS A5" hostesses, probably noticed all the ESF COPY SERVICE BOOKLETS laying out on two long tables. These booklets were not our property and sold for \$10.00 a book fellas. We cannot account for about 25 books guys. I chased one fella down the hall and into the bar - he had grabbed 3 or 4 of them and took off! Now partially our fault, we did not have BIG signs anywhere stating that they were NOT FREE SAMPLES but come on guys - the books were marked. If you happened to have picked up one or more of these books by mistake, we would appreciate you mailing us a check as soon as possible. Each year we provide these books to help you all obtain additional material and to help Ralph Wilson sell a few books.

### IN CONCLUSION...

Dayton, as usual, was a real blast! We had a record turnout again this year despite lots of other similar activities going on elsewhere in the city. This shows us that we have a loyal and enthusiastic crowd that appreciates "quality speakers" and long time planned organization. We are already planning out next year's lineup and it appears that we might be conducting our seminars from not one but TWO meeting rooms at the RAMADA. We will stagger the speakers into mode categories per room so you won't have to shuttle back and forth so much. Thanks for attending and supporting our work. It is a lot of work, but worth it when we hear how well you enjoyed attending. -WB0QCD (and KA0JAW).

Live from Fabius, New York... it's the

## "QSO Amateur Radio" Network!

The Show everyone has been taking about!

Tune-In on Spacenet 1 Channel 15

S-T-A-R-R-I-N-G

Jim Bass Bob Heil Gordon West and others!

Perhaps you have already heard the good news. Word travels fast in Ham Radio circles. Maybe you caught one of our broadcasts already on Monday nights? Could it be possible that you haven't heard anything about this exciting new event at all?

History was made this year on January 15th when a few brave souls in upper New York state devoted several hours of their own time and gambled some of their own financial resources to venture forward with a dream that has now become reality. The very first "QSO Amateur Radio" TVRO talk-show program hit the airwaves originally on GTE commercial space satellite on Spacenet 3 Channel 4 from Fabius, New York. In March, the program switched to Spacenet 1 Channel 15 (120 degrees). With special arrangements made with The BLOCKTOWN SATELLITE Network for using up "dead" air-time on a usually busy RACE CAR NETWORK, valuable low-cost UPLINKING time was arranged to sponsor a then twice per week (Monday and Tuesday) satellite dish receptive program devoted entirely to Amateur "Ham" Radio.

A few had "talked about" such an idea for several years, but Jim Bass of Syracuse, New York actually went out and "did it"! Jim is not yet a Ham, but is working on his Ham license and testing material. He has been around Hams and electronics for over 30 years - so to talk with him - he can hold his own on about any electronic related subject.

Three hours of total Ham Radio video/audio programming on Monday nights have been sent out each week since March over the GTE orbiting satellite to some 39 countries covering all of North America, Alaska, Mexico, Hawaii, the Caribbean, Central America and even parts of South America. An estimated 400,000 dish owners and viewers are said to be watching the program each week. Some pretty sophisticated equipment and 750-800 watts of TV video and audio power is required for a closed-circuit color picture and full quieting audio from Earth to the bird some 22,500 miles away.

The programming at this point may not be Academy Award winning material but it is interesting and FUN to watch! One night you'll see Bob Heil K9EID talking and demonstrating his audio filtration systems and microphones. Another night you might see Gordon West teaching a class in Connecticut. When videotaped programming is not running, attractive and colorful, KRYON computer aided generated ads appear with a handful of early supporters: AD sponsors and idea believers like; CQ Magazine, Wilson Electronics, VHF Communications, The SPEC-COM Journal and T.D. Systems. Videotaped programs using Super VHS or better is always sought after material.

Hams and non-Hams alike, have been calling in from all around the country including Canada. Hundreds of them! "The phone just doesn't stop ringing on Mondays" commented Jim Bass Executive Director of Telecommunications in a recent phone interview. The "live" call-in talk show discusses every subject imaginable about our favorite hobby. One minute, they will be talking about the benefits of FM Television while later on, a discussion about "How To Get The Lowest SWR On Your Feedline" will be batted back and forth between callers. Jim Bass keeps saying; "This is your show guys and gals. Let's talk about whatever you want to!"

Now, another network growth movement is about to take place. "QSO Amateur Radio" is undertaking their next BIG STEP into going with not one but 5 nights per week AUDIO with a possible added West Coast Talk-Show host and timeslots! An AD AGENCY was hired and a PROGRAM COORDINATOR to try to gather both financial and moral support for such an undertaking. So far, lining up other talk-show hosts has not been the problem. Everyone wants to get in on the act! Finding committed financial sponsors has been a more difficult task. Unfortunately, the ARRL (American Radio Relay League) national Ham Radio organization in Newington, CT turned down an offer of partial sponsorship for what the network is trying to accomplish. It is

hoped that other organizations like NARA, AMSAT, The USATVS, QCWA and others including major Ham Radio manufacturers like KENWOOD, YAESU, ICOM, ALINCO, AEA, KANTRONICS, MIRAGE, CUSHCRAFT (and others), multi-store wide chains such as Amateur Electronics, Ham Radio Outlet and Gateway Electronic Stores as well as the smaller, but just as important individual dealers will rally and get behind the "QSO Amateur Radio" show idea to keep it going and growing!

As mentioned, talk show hosts and guests have been relatively easy to find. Greg Mengell KA6DPV has volunteered to host a WEFA Mode Information Show. Bill Brown WB8ELK of 73 Magazine and Elktronics, Mike Stone WBOQCD of SPEC-COM Communications and Steve Franklin WB5KGL of T.D. Systems both want to do ATV related programs. Bob Grove - Editor of Monitoring Times wants to do a regular weekly Shortwave and Monitoring program. AMSAT's Northwest Regional Coordinator Joe Holman KA7LDN has agreed to do an OSCAR Satellite and Space News show. Gordon West wants to take his act of helping others to get into Ham Radio "to the airwaves". Even the ladies will be represented with guest host Connie Dunn KB5LES premiering her "YL's Night Out" program! Other talk show hosts are now being lined up as well (If interested - call (319) 452-3628).

Larry Scott N2HIK of KJD Teleproductions in Voorhees, NJ has offered to produce and assemble inexpensive videos for advertising and programming (609) 751-3500. Tapes are arriving daily to Jim Bass a crew providing all kinds of new programming material for months and months. Viewers are excited about what they are seeing and hearing and they are responding!

Some Hams are taking the downlinked show's signals and relaying it into FM or ATV Repeaters or are asking Cable-TV of PBS facilities to pick up or tape the weekly broadcasts to air at a later time for other viewers who do not have TVRO dishes. Commercial advertising, music and other questionable material presented is being withheld from getting on the air by advanced warnings from the network. Check out the flea markets at Hamfests and call your nearest TVRO dealer. Satellite TVRO receivers, demodulators, LNA's and dishes have come way down on price and this technology is now affordable to nearly everyone, even those living on a limited electronic budget.

"For show or technical information, call Jim Bass at (315) 673-3752 or write to: P.O. Box 254, Syracuse, NY 13215 (SASE). For programming or advertising information, contact "Closed-Circuit Video Productions" R2 Box 86, Clarence, IA 52216 or call (319) 452-3628".

## A.E.A. CORP. TO DISTRIBUTE AND CO-SPONSOR NEW ATV BOOK!

AVAILABLE AT AEA DEALERS IN JULY

Last fall, SPEC-COM Communications & Publishing Group Ltd. announced the assembly of a new, updated Amateur Fast Scan TV Handbook. The last ATV book distributed sold 3,000 copies in just a few years time. Originally planned for 12 Chapters and 96 pages at \$9.95 and a December 1990 release, as contributing authors began submitting material, it became clear that a much larger book was taking shape. The next target completion date was set for April 1st 1991 with 16 Chapters and 120 pages. WBOQCD (Assembler and Coordinator for the book) brought finished "master" paste up sheets to Dayton for some key people in the industry to review before printing. Steve Franklin WB5KGL and Don Miller W9NTP recommended that an FM-TV chapter be added and promised to submit manuscripts on the subject. On Saturday night at Dayton (RAMADA ATV/WEFA WORKSHOP SESSION #2), Mike Lamb N7ML of A.E.A. stated that his company would be interested in sponsoring the publication (by purchasing exclusive advertising space) and that they would like to obtain "full licensed distribution rights" as well.

"THE AMATEUR TELEVISION OPERATORS HANDBOOK (C) 1991 by SPEC-COM Communications & Publishing Group Ltd. is now expected to be released into the A.E.A. Retail Dealer network by June 15th. The revised, much thicker, HAM-TV technical manual is anticipated to publish at around 140 pages and will have a \$14.95 retail selling price. Check with your nearest A.E.A. dealer and place your order ahead of time so they know how many copies to order in on the initial order."

Those USATVS members who have already placed EARLY BIRD orders with SPEC-COM Communications will have their orders honored (at the lower price) with shipments made from Iowa as soon as these books are available. The books however, will not be available to any others from SPEC-COM Communications directly. You must go through A.E.A. to get your copies. -KAQJAW

# WYMAN RESEARCH INTRODUCES TRIDON LINE

Getting on ATV  
is as easy as:

1  
2  
3



## TRIDON AM 450 MHz TRANSMITTER

## TRIDON 2000 AM 450 MHz TRANSCEIVER

## TRIDON FM TRANSMITTERS 900 MHz 1200 MHz

### 1 450 TRANSMITTER

Power output is 3W peak; two independent audio systems (Sub-carrier and On-carrier); 10 pin camera connector on back-BNC or RCA connectors on front; SYNC stretcher for optimum composite video; standard crystal frequency: 439.25 MHz or 434.00 MHz; powers video camera (10 pin connector); requires 13.8V DC at 600 MA plus camera power (1 amp); RF tight aluminum cabinet with brushed aluminum panel; size: 2.2" x 5.25" x 5.5" (Includes receiver antenna switching relay).

### 2 450 TRANSCEIVER

Power output is 3W peak; 10 pin camera connector on back panel, BNC or RCA connector on front panel; monitor video from camera or detected video output; all new video and audio circuitry with SYNC stretcher; new two channel audio system on transmit; new more powerful video transmitter; standard crystal frequency: 439.25 MHz or 434.00 MHz; .8 dB NF GaAsFET pre-amplifier; RF tight aluminum cabinet with brushed aluminum panel; size: 2.2" x 7" x 5.75"; relay switched antenna.

### 3 FM TRIDONS Both Have:

Pre-emphasis circuitry; "N" connector; RF tight aluminum cabinet with brushed aluminum panel custom designed by W9YL; cabinet size: 2.2" x 8.2" x 5.5"; requires 13.8V DC at 2 amps; large heat sink.

**900 MHz:** 915 MHz FM-ATV transmitter; power output is 8W; 4.5 MHz audio Sub-carrier; uses new phase lock loop crystal controlled exciter.

**1200 MHz:** 1255 MHz FM-ATV transmitter (any optional frequency); power output is 4-5W; 6 MHz audio Sub-carrier (requires 1V PP audio); Wood-Douglas construction.

Don & Sue Miller  
W9NTP  
W9YLY

# WYMAN RESEARCH, INC.

R.R. #1 BOX 95  
WALDRON, INDIANA 46182  
(317) 525-6452

(SEND SASE FOR OUR LATEST FLYER SHEETS)

MIRAGE, RF CONCEPTS  
SPECTRUM INTERNATIONAL  
PRODUCT DEALER

INDIANA RESIDENTS 5% SALES TAX  
SHIPPING \$4.50

## CONVERT YOUR BIRD WATTMETER TO P.E.P. READOUT!

by Bob Crews KJ4CQ  
Lewisville, North Carolina

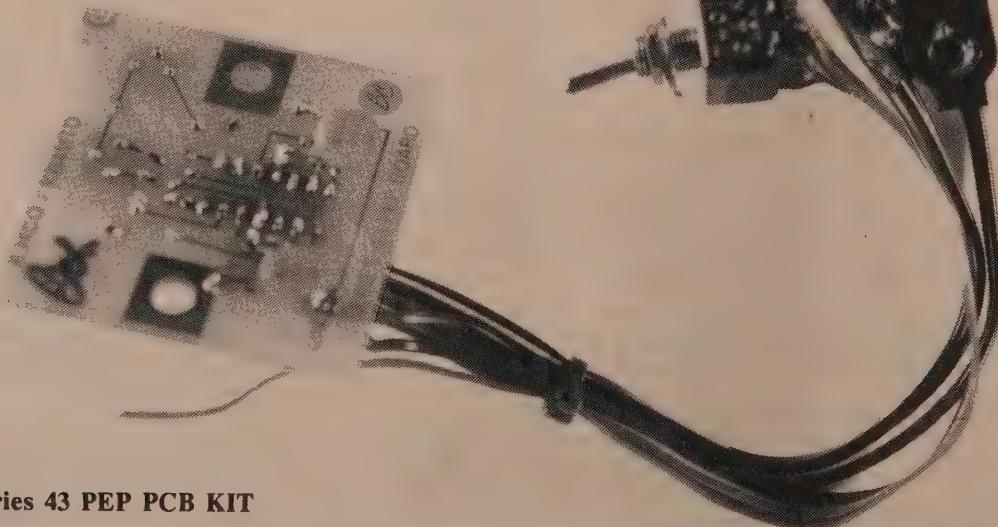
I ran into Mike Stone WB0QCD in the Dayton Fleamarket this year and showed him my Series 43 PEP circuit boards used for converting your Bird 43 Wattmeter to a "Peak Reading" wattmeter. He said this would be of definite interest to the UHF and ATV community and so, he ask me to do a followup article in the pages of SPEC-COM, The USATVS Journal.

The Series 43 PEP circuit board, once installed inside the wattmeter, operates in RMS or PEP mode condition at the flip of a switch. Installation is very easy. This circuit also works with any model wattmeter that uses a 30ua meter movement.

Why the need for a P.E.P. reading wattmeter? For ATVers who are tired of reading what has been inaccurately termed "average power" during the sending of wideband video TV transmissions, P.E.P. shows a better, truer picture of what is really happening from the transmitter to the antenna. Not only do Hams NOT know what they are missing by using a regular RMS type wattmeter reading device while transmitting SSB but they are misled into thinking they have far less power output than they really do. This is because of the damping of the meter when transmitting a very complex multiple tone signal through a meter designed for CW.

You can now use the meter which is referred to as a standard of comparison to monitor peak power output at all times as well as to tuneup your linear amplifier on sideband rather than abusing your finals trying to tune up in CW. With this board, you can make adjustments to your amp as you talk instead of moving off frequency or to a dummy load which probably doesn't match your antenna system anyway. You'll also see how easy it is to adjust mic gain and precessing to the best levels without overdriving and distorting. Many HF operators can't understand why their meter won't show the same readings in SSB until they crank everything to the right (and then get bad audio reports). You'll like the way the meter responds to your every syllable and floats at your peak output power level. It is the next best thing to having an oscilloscope in line at all times and it is easier to use!

The miniature toggle switch that I recommend installing gives the operator two choices of wattmeter reading capabilities. You can, however, elect NOT to install the switch and have your BIRD 43 running converted P.E.P. all the time. This would be especially applicable to Fast Scan TV operators who dedicate their BIRD 43 to ATV operation all the time and use it for nothing else. If a hole is not desired to be drilled into the shell housing of the wattmeter, the wires can simply be run out the back of the meter and switched that way as well. It's your choice.



Series 43 PEP PCB KIT

## RMS/PEP CONVERSION for BIRD 43 Wattmeters

"See" the RF SSB/ATV power that you are missing! Simple conversion circuit board and installation brings your BIRD 43 wattmeter "alive"! Switch selectable RMS/PEP meter readouts. Mounts inside or outside wattmeter. Works with all 30ua meter movement wattmeters.



PEP PCB KIT: \$65.00 ppd.

### KJ4CQ CIRCUIT PROJECTS

8589 Brook Meadow Lane  
Lewisville, NC 27023  
(919) 945-9910

The BIRD 43 Wattmeter referred to is a product of:  
BIRD Electronic Corp., 30303 Aurora Rd., Cleveland, OH 44139

**INSTALLATION TIPES:** 1) Remove the nuts and washers from both meter posts. Remove coaxial leads from the positive (+) and negative (-) posts of the meter and solder the center coax lead, which was on the positive meter post, to the loose wire on the supplied ribbon cable. 2) Install the KJ4CQ PEP board on the back of the meter with trimmers located at top. Re-install only the negative (-) coax lead back on the meter post after mounting the PEP board. 3) Install fresh new 9 volt batteries preferably from the same manufacturer's lot code number on the battery clips. 4) Adjust "Null" trimmer located at the top center of the board for a zero reading on the meter in the PEP position. Adjust "Calibration" trimmer located at the top left of the board for the same reading on the meter in the PEP and RMS switch positions with RF power applied from the exciter. That's it, nothing else to do!

Very old BIRD 43 wattmeters may have meter post center to center dimensions different from the mounting holes dimensions on the PEP PC board. Some routing out of the holes may be necessary for proper fit to the back of the meter.

I have delivered one of these PEP circuit board systems to Mike Donovan KA0JAW up in Dubuque, Iowa in exchange for a few years subscription to SPEC-COM. You guys look to have a very interesting magazine. Hopefully KA0JAW will report back to you all what he thinks of my little contribution to the hobby, especially for use on FSTV. The PEP circuit board "kit" sells for \$65.00 and I do take mail orders. I have sold hundreds of these to Hams and professional, industrial customers alike. They work as stated. Thanks to WB0QCD for showing interest in my product and getting me the publicity in this magazine. 73's -Bob Crews KJ4CQ, 8589 Brook Meadow Lane, Lewisville, NC 27023.

## FCC NO-CODE AMATEUR RADIO LICENSE

The FCC recently passed Docket 90-55 which for the first time allows a new codeless entry ham radio license of technician grade. Privileges 30 MHz and above - ALL modes! (Send SASE for copy of R.E. article)

One ham magazine covers ALL the specialty modes! Feature Writer's and regular Column Editors help you along, educating and updating you on what's happening "on-the-bands". Start your subscription today & join in on the fun!

**FSTV SSTV FAX RTTY PACKET  
AMTOR OSCAR FM REPEATERS  
MICROWAVE AND LOTS MORE!**

SEND  
\$20  
CHECK  
OR  
MONEY  
ORDER



**The SPEC-COM Journal**  
P.O. Box 1002,  
Dubuque, IA 52004  
(319) 557-8791

MC/VISA (5% added)

OUR  
24TH  
YEAR  
SINCE  
1967!



## MECHANICAL TV WORKSHOP?

The USATVS Journal, quite noticeably, has taken a much more serious interest in Early Mechanical Television. Our special session this year at Dayton demonstrated a lot of genuine interest in the subject. This issue, has a lot of technical building information by Peter Yanczer. Jim Hawes KB9EPQ, our "Early TV & Radio" CATHODE GLOW Column Editor has a great idea: Why not get those who are interested in building up a SEND/RECEIVE system together for a builder's workshop this fall? Have 3 or 4 hours of specific construction details and all the key and hard to find parts available for purchase (TELSA, as does a British Company, has this material in KIT form). Bring in some guest speakers and collectors again like we did at Dayton. Sort of a #2 WORKSHOP continuance. Okay, let's do it! What do 'ya think? How about the 2nd weekend in September at the large 2-day PEORIA, IL "SUPERFEST" (September 14th and 15th)? Let's take an on-grounds HAM-FEST site Amateur TV meeting Saturday Night. Peoria is well centralized. Over 100 ATVers attend this Hamfest each year from Indianapolis, Chicago, Quad-Cities, Minneapolis, St. Louis, Michigan, Ohio, Dubuque, Des Moines, etc. Sound interesting? How about getting FCC STA's for these builders and actually experiment in sending pictures "over-the-air" on 10 meters or 160? Wouldn't that be a kick? Contact Jim Hawes and let him know that you think this is a good idea (708) 674-3421. If we get enough interest, we will officially announce the get-together in future issues. -WB0QCD



## VINTAGE TELEVISION

### WHAT WAS MECHANICAL TELEVISION?

BY: PETER YANCZER

Very often I'm asked about mechanical television because few people know about the pioneering work done during television's early years. If a group of people were asked when television originated, the majority would say either 1939 or 1947, depending on their ages. Some of the older persons in the group might say 1930 or so; of course, they would be fairly accurate.

"Mechanical television" refers to a particular class of equipment used for producing television images of fixed or moving objects. Specifically, the term refers to television cameras or receivers which did not use some form of cathode ray tube. Many of the mechanical receivers were extremely simple, consisting of little more than a motor with rheostat, a scanning disk and a neon lamp acting as the light source. This plus a radio were the makings of a 1930's television set. Each major manufacturing company here and abroad had its own ideas on how the mechanisms should work. They (or the companies) developed many interesting and ingenious designs, using combinations of spinning disks, lenses, mirrors and light sources. Some companies were producing more elaborate forms of receivers containing lens disks, mirror drums, phonic motors, Kerr cells and even dual radio receivers which provided simultaneous sound reception with the picture. Mechanical equipment could produce a better quality image at far less cost. The pictures were brighter, sharper and more stable than those that could be achieved with the cathode ray tubes of the day.

A number of broadcast stations were carrying

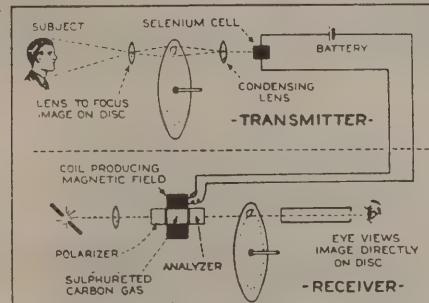


Figure 1. Nipkow's scanning disk system of 1884, from "The Mechanics of Television" by the author.



Figure 2. 48-line image taken from a photograph with a direct pickup camera.

a regular schedule of television programs in the years 1928 through 1930. Stations were usually equipped with one or more studio cameras of the flying spot variety and some form of movie projector. All of the stations' television equipment was mechanical in nature and provided images with 48 or 60 lines. The available resolution limited most transmissions to close-ups of actors or objects in the scene. Figures 2 and 3 show two examples of the image quality which might have been available from these systems. (These images were obtained from equipment developed



Figure 3. 60-line picture of the author's daughter, Katherine Yanczer. Taken with a flying spot scanner.

by the author which, using modern technology, attempts to duplicate and enhance the early scanning disk systems).

While development of mechanical systems continued, engineers in the United States and abroad were continuing their experiments in electronic television. Gradually the cathode ray tube problems associated with brightness, sensitivity, focusing and synchronizing were solved; by 1936, cathode ray tube equipment was outperforming the best mechanical equipment of the day. More important, mechanical design limitations were preventing further improvement while in the electronic systems further improvement was just a matter of time.

While mechanical television was on the scene so to speak, much was learned about the use of cameras, lighting, set design and about the expectations of the audiences. All of this knowledge and technique carried over to the electronic era and allowed the new system to progress much more rapidly than it might have otherwise.

(Peter Yanczer's book, "The Mechanics of Television" was reviewed in the September 1987 issue of A.R.C. and is available from the author His address is 835 Bricken Pl., Warsaw Woods, MO 63122)



TESLA ELECTRONICS CO.  
835 BRICKEN  
ST. LOUIS, MO 63122

# WHY NOT BUILD YOUR OWN MECHANICAL TELEVISION?

Most people believe that television came on the market in 1947 or thereabouts. Few realize that its development began before the civil war. The hope then was to transmit photographs or written messages over existing telegraph wires. Much of the early work was limited by the hardware. As early as 1907, a complete electronic system, similar to the one in use today, was described by a well known engineer of the day. It would be many years before such a system could be built.

By the middle to late 1920's, engineers like John Baird of Scotland and C.F. Jenkins of the United States began producing mechanical television equipment utilizing the eye's persistence of vision. They used scanning disks (or one of its derivatives) with photoelectric cells to record images and another disk revolving in synchronism, to reconstitute the image. Their early receivers used a neon lamp behind the disk to form the visible image. Their equipment could produce recognizable moving images of persons, shapes of forms. In 1928, Baird successfully transmitted images of London to New York, 34 years before the Telstar satellite transmitted images of London to New York, across the Atlantic. In 1930, he marketed the Televisor, the first mass produced mechanical television set.

Developments came rapidly during these years and by 1931-1932, many broadcasting stations were scheduling regular television programs. By this time over 500,000 receivers had been manufactured or were built by home constructors. "Lookers in" were very enthusiastic about their reception and wrote to the stations describing their scanning equipment and to tell how they were able to see a persons lips move or smoke rise from their cigarette. But mechanical television was not destined to become a commercial success because the Pictures were small and limited to close ups because

Just as experimenters then became excited by actually seeing pictures on mechanisms of motors and spinning disks, today you can enjoy the same thrill, seeing what they saw, with equipment like they used that you can build yourself. If you're "handy" and have tools, you can build it all. If not, purchase those parts that you don't feel comfortable in making. Many early experimenters bought some



manufactured components and built only a portion of their scanning receivers. You can still purchase similar materials that are the same as those used in my own equipment. It's tried, proven and it works! Those that have the skills and tools can build their own components, using the information available in such books as "THE MECHANICS OF TELEVISION".

This book provides information for building various types of cameras and receivers which together produce operating systems that really work and with all of the attributes of early equipment. And I am now supplying both cassette and reel to reel tapes in two formats, for those who want to build a receiver that they can demonstrate without the expense or effort necessary to build some sort of camera. And with a little extra effort, a cabinet can be built along the lines of those used on the original receivers. Mechanical television is a unique and fascinating hobby that can further the skills of both young and old. The equipment never fails to attract attention and capture the interest wherever it's seen.

Many of my friends and acquaintances tell me "Pete.... nobody wants to build anything any more!... Look at all the kit manufacturers that have cut way back or gone out of business. There's hardly any of them left. No doubt a lot of people would like to

have working mechanical TV, but nobody's going to take the trouble to build one."

To this I say BULL-PUCKY (I might use a slightly stronger term in private conversation). I have letters and pictures from many people who have built or are building cameras and/or receivers based on information available in my book. Judging from the pictures I've seen, I'd say that many of them are mechanics or machinists, electricians, carpenters, technicians or engineers. I happen to know that there is also a couple of doctors out there working on these things. The construction methods vary quite a bit. Some use a lot of wood in their assembly and others tend to use more metal and plastics. I suppose it depends on what you can get your hands on. Most builders prefer to buy the electronics rather than build. But the thread that ties all of these people together is the enthusiasm their letters exude when describing their project and the results they've achieved.



Like most projects, the most difficult thing is getting started... This is especially true if the project appears to be totally different from the things you've been doing up to now. But like most things, you learn as you go and later you are doing things you might not have attempted earlier. The more you become involved, the better you understand the system and the better you're able to make the equipment perform. This kind of project is suitable for anyone from age 9 to 90 and if you do get stuck, I'm here to help you.

Peter Yanczer



BAIRD, 30 LINES, (1929)



48 LINES



BAIRD, 30 LINES, (1929)



48 LINES



24 LINES



60 LINES



36 LINES



48 LINES



48 LINES



REPRESENTATIVE PHOTOS OF IMAGES FROM MECHANICAL TELEVISION RECEIVERS.  
NOTE: THE XEROX COPY PROCESS DEGRADES THE ACTUAL QUALITY OF THE IMAGE.

# Mechanical Television for the Average Man

By Peter Yanczer

The era of mechanical television is one of the most fascinating periods in radio history. Most modern day radio collectors were born after the heyday of mechanical television and though many have read and heard about it, few have ever seen one, much less seen one that operates. Because so little of the original equipment has survived, it is highly unlikely that the average collector will ever obtain an original piece for his collection. This severely limits any chance for "hands on" experience for most of us. Therefore, the average radio collectors understanding of mechanical television is usually based his "know-how" of modern television equipment plus any additional information gathered from articles or books on the subject or discussions with knowledgeable persons.

A way around this problem is to build your own. Not necessarily duplicate an existing antique model, but at least one that has all the important attributes of the early equipment. This can be easy and with a little extra

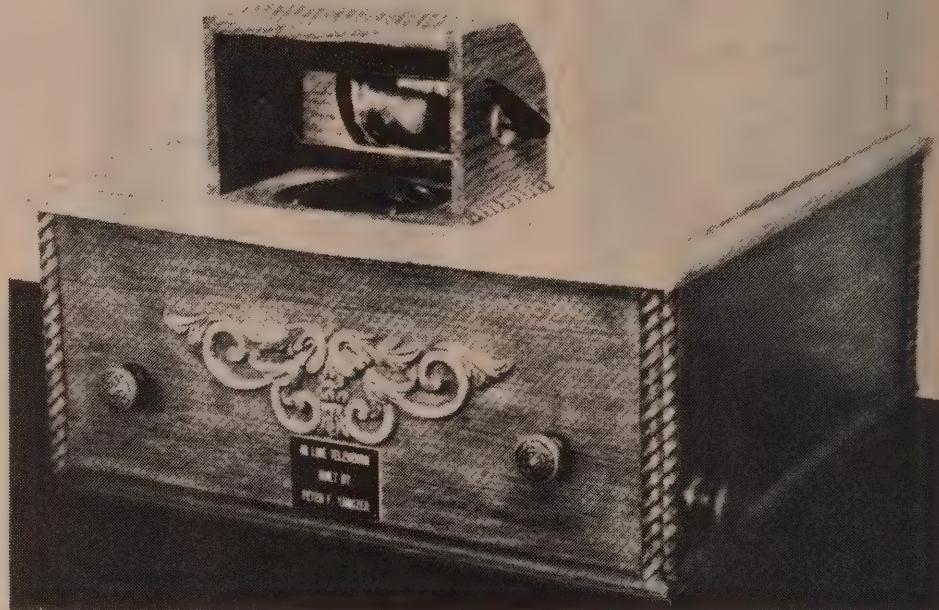


Figure 1

effort, it can be a nice looking piece, one you would be proud to display and show to your friends. An example of one you might try is pictured in Fig. 1. This receiver is loosely patterned after the Insuline "Visionette" described in Radio News for February 1932. It operates on the 48 line, 15

frames per second Jenkins standard format. The 48 hole, 16 inch diameter scanning disk operates in a horizontal plane and the image on the disk is viewed through a fixed magnifying lens and an adjustable mirror on top the cabinet. Image brightness and contrast are controlled by knobs on the front of the cabinet.

Figure 2 is a view of the assembly looking into the cabinet with the top and the scanning disk removed. There are four major components of sub-assemblies. They are 900 RPM synchronous motor and disk, the video amplifier, the LED array and the cabinet. All of the sub-assemblies are rigidly mounted in the cabinet except the LED array. The framing knob is able to move the array from left to right approximately 1 inch. Figure 3 provides a closer view of the construction and assembly of these components.

The motor is mounted on a .25 inch aluminum plate attached to the .75 inch plywood bottom. The plate is actually outside the cabinet and the motor passes up through a clearance hole in the plywood. This method of mounting is used to reduce the over all height of the cabinet. The motor has an optional heat sink attached to its base and the phasing capacitor is

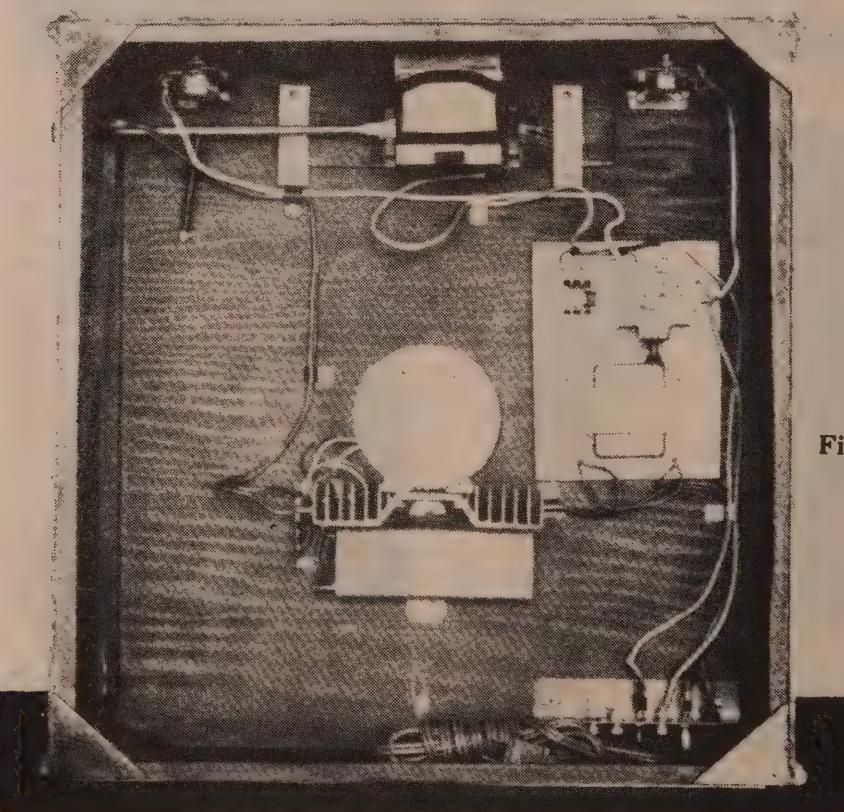


Fig. 2

*Continued on next page*

mounted beside the motor on the plywood bottom. The motor wiring passes through a momentary push button power interrupt switch to provide a "course" adjustment for image framing. The switch is mounted on the front right side of the cabinet. The scanning disk is attached to the motor shaft through an appropriate hub made for the purpose.

The purchased video amplifier is a printed circuit board assembly that is mounted on four corner bushings with screws. The separate brightness and contrast potentiometer type controls are mounted on angle brackets with their shafts passing through holes in the front panel. A short length of angle stock is also located at left rear corner of the cabinet to support the main power switch, the AC line cord and the video input connector.

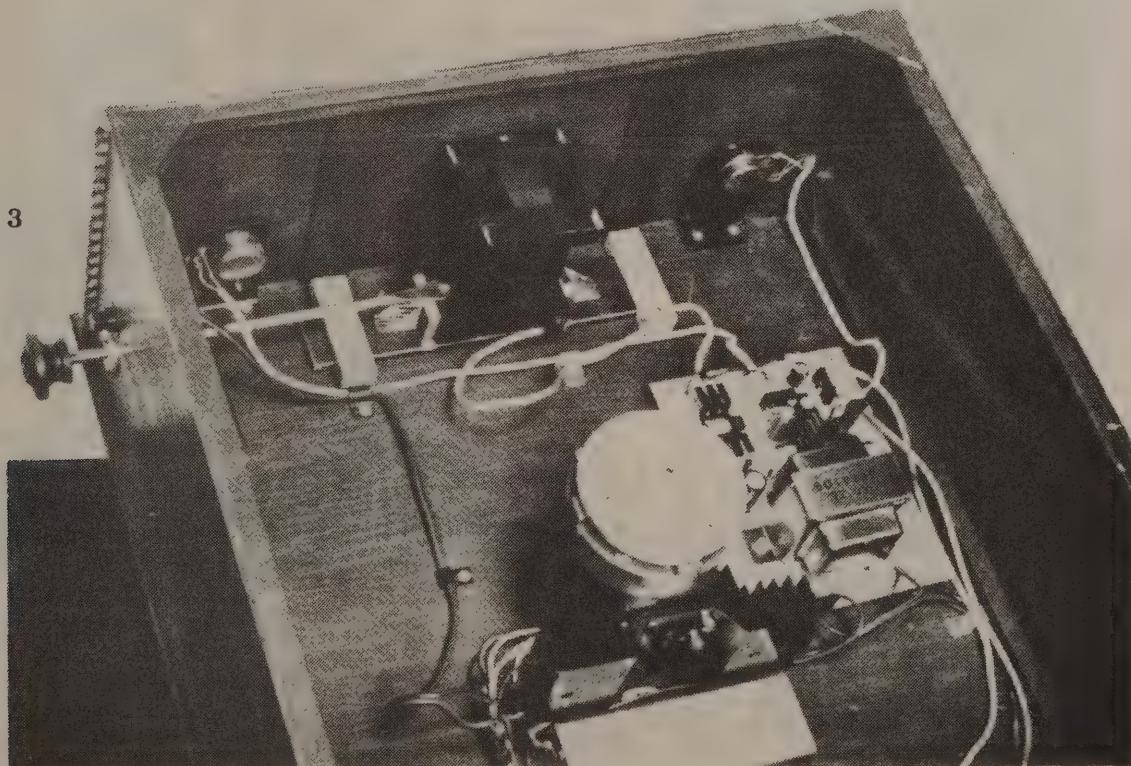
The LED array consists of a 4 inch long wood or metal tube approximately 1.25 inches square. Thin plywood (.125 inch) and "white glue" are suitable construction materials. The upper end of the tube is equipped with a ground glass diffuser and masked with black electrical tape for the appropriate image size and shape. The lower end of the tube is mounted

at the center of a .125 inch by 8 inch by 1.5 inch plywood board. This board is able to slide approximately one inch in its long dimension, guided by two wood channels. The channels allow the array freely to move left and right, but restrict movement in all other directions. One end of a .25 inch diameter brass or aluminum rod is connected to the sliding board, the other end passes through the cabinet side near the framing switch. An attractive knob is installed on the shaft and pushing or pulling on this knob adjusts the "fine" framing. Two 16 pin DIP IC sockets along with eight .25 watt resistors are mounted inside the tube with the sockets as near the bottom as practical. Sixteen red or yellow Hi-Brightness (160 Mcd min.) lamps are used. The light from red LED's resembles the color of the neon lamps used in vintage equipment and the yellow variety closely simulates the image color achieved when Kerr cells were used with tungsten lamps. Either type will provide clear bright images but yellow lamps will give improved contrast.

The cabinet is approximately 17 inches square and 8 inches high, not including the "dog-house" containing

the adjustable mirror. The plywood base has a 1.5 inch wide trim board all around. This is shaped with a router on the front and both side edges. The front and sides of the cabinet are thin mahogany plywood of the sort used for paneling rathskellers, cemented to a simple wood frame made of .5 inch square lumber. The back is open. The seams between the front and side panels can be covered with a decorative wood strip. The top is .25 inch plywood and two sides. Near the front center there is a 4 inch diameter hole cut out for magnifying lens. This opening is positioned over the LED array. The cabinet top is held in place with clamps or hooks in front and screws in the back. A 3 by 5 inch mirror is mounted on a plate in the dog-house. This plate is attached to a .25 inch shaft passing through both sides of the dog-house and extending out the right side far enough to attach a control knob. A small coil spring between the knob and the housing creates enough friction to keep the mirror in position. The dog-house is also thin plywood and is attached to the cabinet with small screws. All of the visible edges can be covered with decorative lumber. The inside of the

Figure 3



dog-house is painted flat black. The large magnifying lens is mounted to the underside of the cabinet top with two or three small wood clamps and screws. The inside of the cabinet should be painted a dark color (not necessarily black), to reduce internal light reflections that might escape through the lens and reduce image contrast. Cabinet finishing is up to the builder, but I do recommend attractive wood inlays or carvings as an added eye interest.

This receiver will produce clear stable images when connected to a camera operating with the same format. The image is approximately 2 inches square and can be viewed in moderate room light. This receiver will also operate from tape recordings (cassette or reel to reel audio tapes), but in its present form will not "hold sync." Although an image will be seen, it will constantly move to the left or right, depending on the motor speed in the tape player. In order to achieve synchronization, it is necessary to install an additional motor amplifier. The tape signals include a synchronizing signal for this purpose. The tapes provide images of test patterns for setting up and including motion picture cartoons suitable for demonstrations.

Anyone collecting radios, need not be without an example of what early television was like. Especially when its so easy to assemble the parts into an operating system that works just like the original ones did. You can get started by picking up a copy of The Mechanics of Television. This book contains everything you need to know to build a system. The individual parts are available and for those that prefer, the various sub-assemblies are also available, ready to install. If you are interested, send me a SASE (2 stamps). Send it to: Peter Yanczer, 835 Bricken Pl., St Louis, MO 63122



# HEATH BOOK REVIEW

## THE MECHANICS OF TELEVISION BY PETER F. YANCZER

REVIEWED BY RICHARD D. BREWSTER

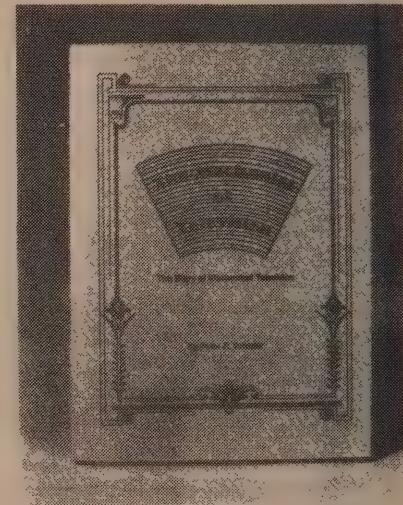
*The Mechanics of Television - The Story of Mechanical Television*, is a technical book for the television enthusiast discontent just to have a mechanical television sitting on his shelf. In addition, with this book one can enjoy the wonders of mechanical television without being among the fortunate few owners of such antiques.

But even if you do not plan to build or even operate a mechanical TV set, this book is a fascinating and informative study into the wonders of the very earliest television systems.

This 5 1/2 x 7 1/2 paperback has nine chapters and six appendices. The first chapter contains a brief history of television from the early 19th century up to the 1930's.

The next six chapters go into the details of the mechanical television system. This begins with scanning methodology and various disc (and drum) arrangements. Also included is a section on scanning motion picture film. Next follows a detailed discussion of motors and synchronizing methods used in early TV. A chapter is devoted to the various television lamps originally employed, as well as light emitting diodes (LEDS) and enclosed arc lamps which can be utilized in the construction of "modern" mechanical systems. Photo electric devices are covered in a chapter which includes discussions of photocells, photo multipliers, and photo-sensitive semiconductors. The television optics chapter takes one from the physics of light to the applications of lenses and mirrors.

The chapter on electronics is a rather detailed



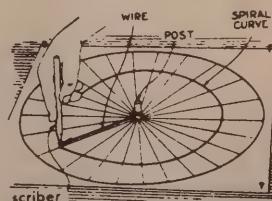
treatise of how the minuscule television signal is amplified and modified so as to operate the appropriate television lamp. Also covered are the design of power supplies for the electronics and circuits for a disc position sensor, a zirconium arc lamp supply, and a strobe lighting system.

Chapter eight describes early television systems. The last chapter covers the actual construction of a modern mechanical television system. The ample detail enables the advanced enthusiast to build working mechanical TV pickup and display units. The six appendices make additional details available to the constructor.

Given my own interest in working with mechanical TV, I found *The Mechanics of Television* a most useful book. Illustrations are profuse and well done. Unfortunately, a bibliography is not included in the book.

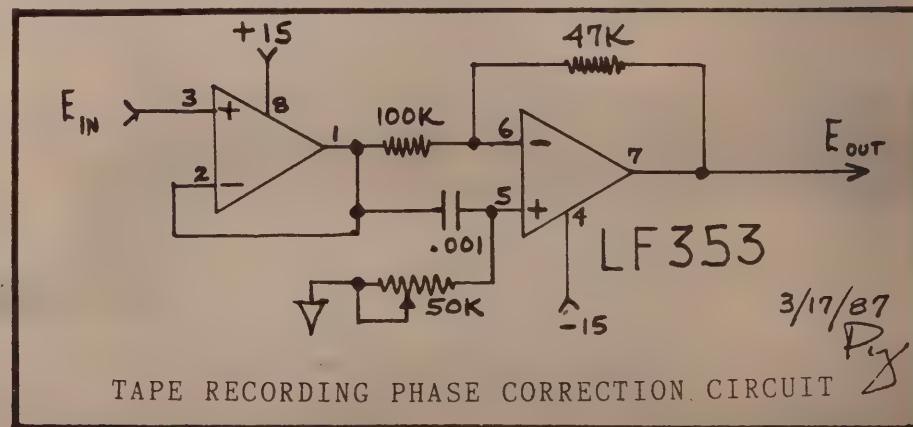
I can recommend *The Mechanics of Television* highly to any antique TV enthusiast as well as to any antique radio collector who wants to become knowledgeable about this fast-growing segment of the antique communications hobby.

Published by Peter F. Yanczer, 835 Bricken Pl., St. Louis, Mo. 63122, 1987, 171 pages, paperback.



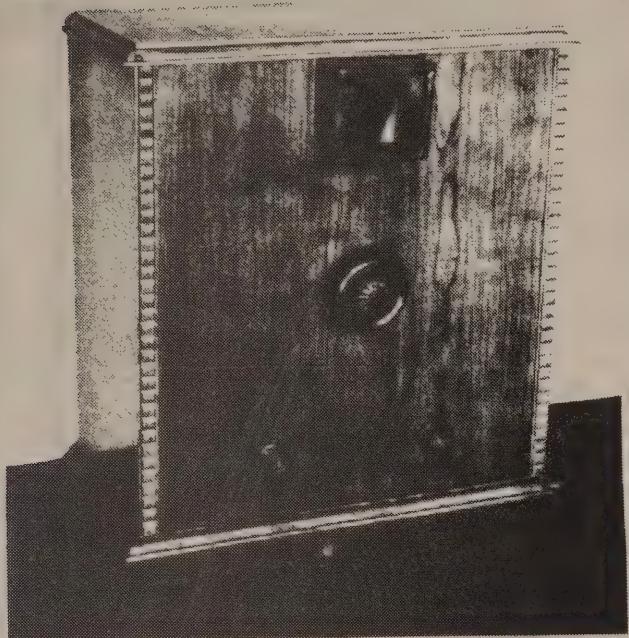
Divide a circle on a metal disk into 24 equal sectors and scribe a spiral

Figure 9.4 from *The Mechanics of Television* shows how to locate the holes on a scanning disk.

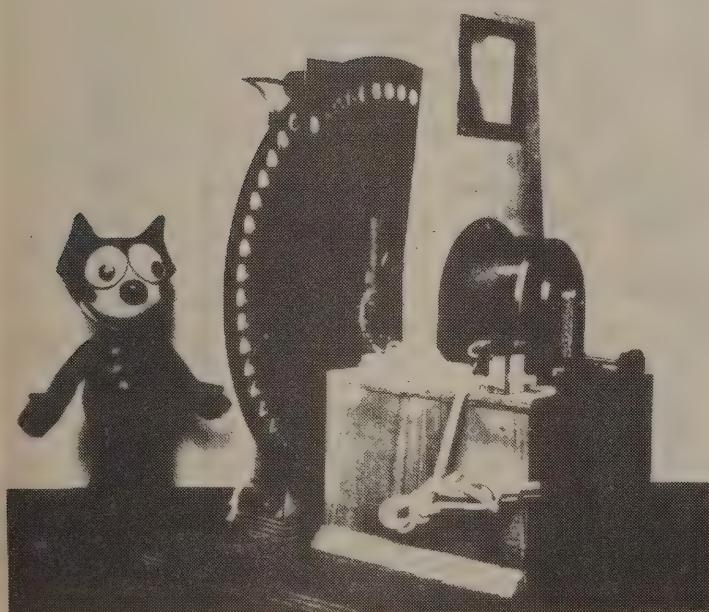




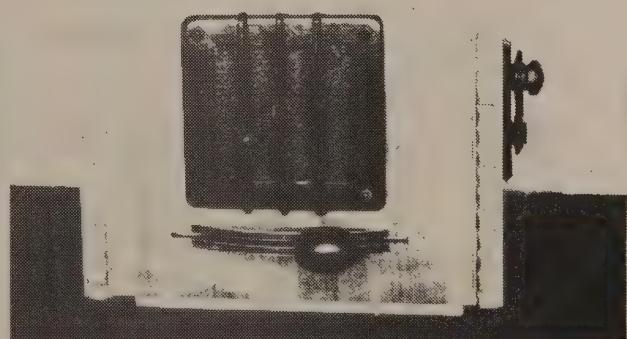
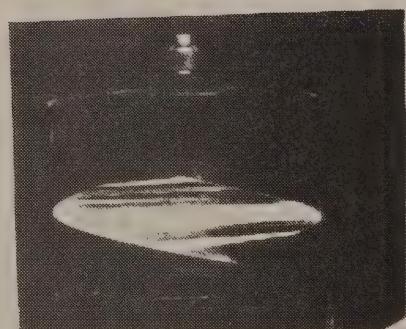
FELIX (CIRCA 1922)



48 LINE RECEIVER, 16" DISK



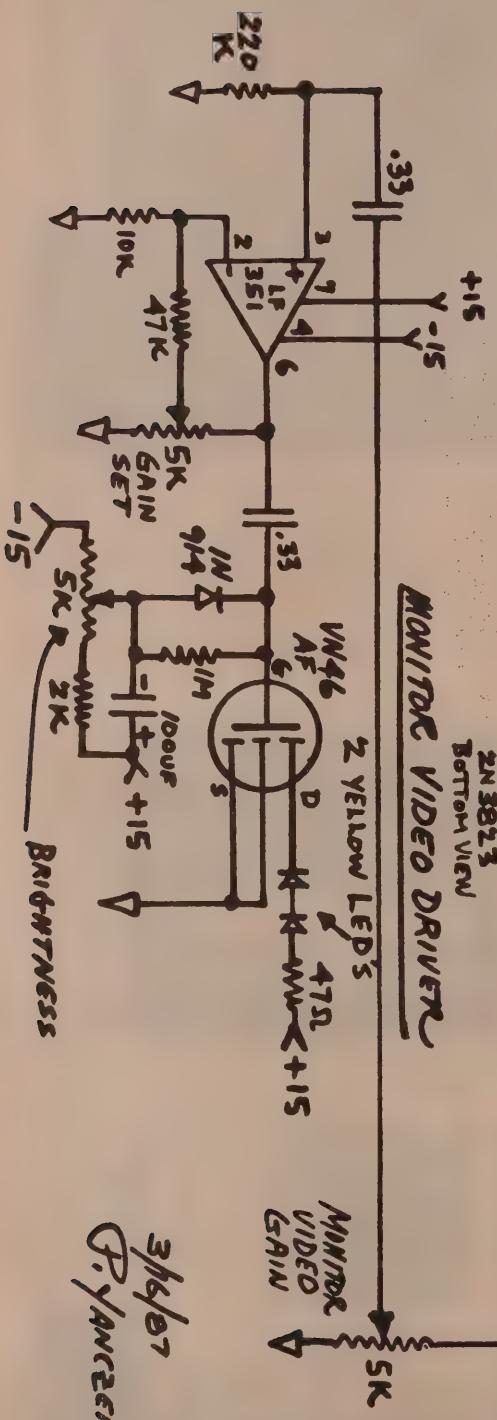
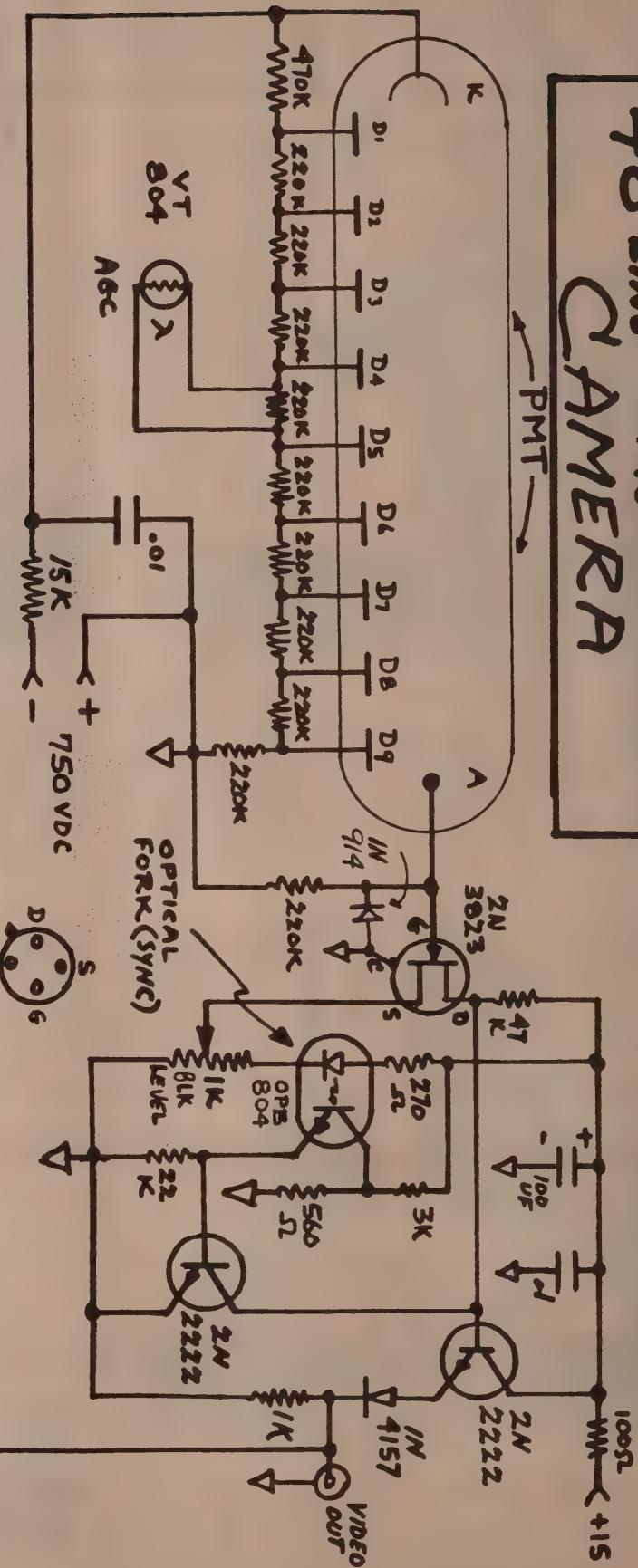
60 LINE RECEIVER, 18" LENS DISK



120 LINE MIRROR SCREW RECEIVER  
6" by 7" IMAGE SIZE

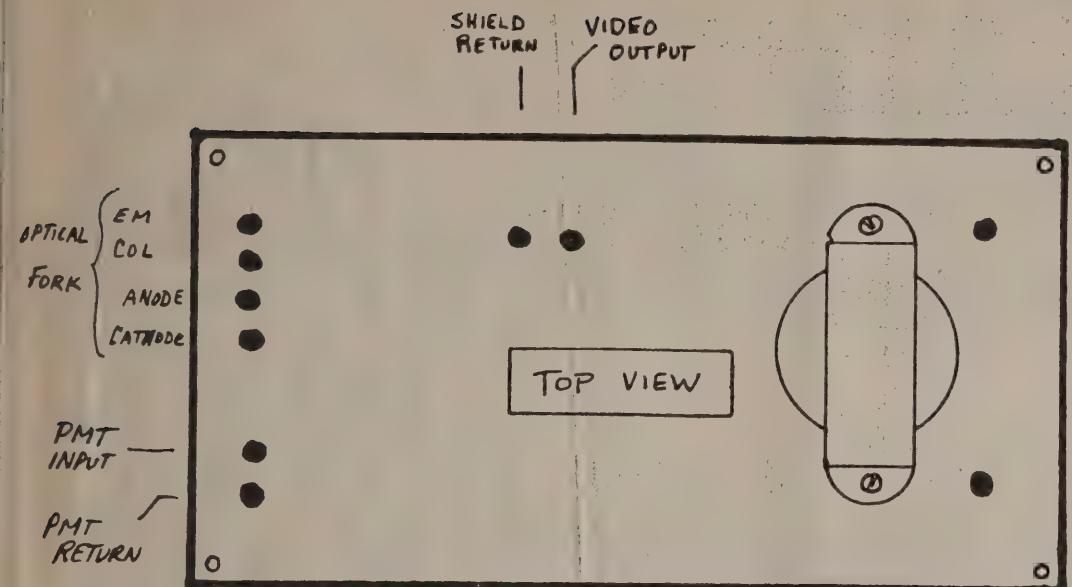
# 48 Line Direct Pick-up CAMERA

PRE-AMPLIFIER DRIVER



TESLA ELECTRONICS CO.  
835 BRICKEN PLACE  
ST. LOUIS, MO 63122

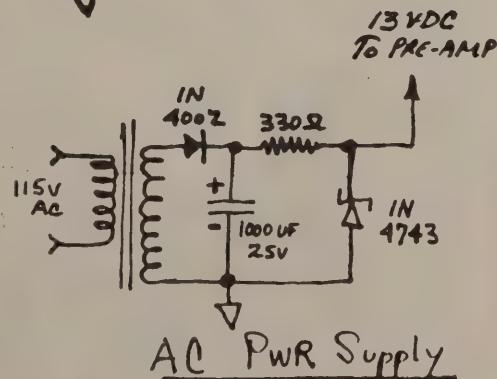
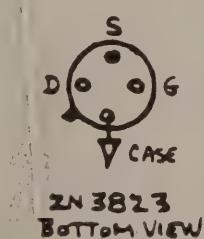
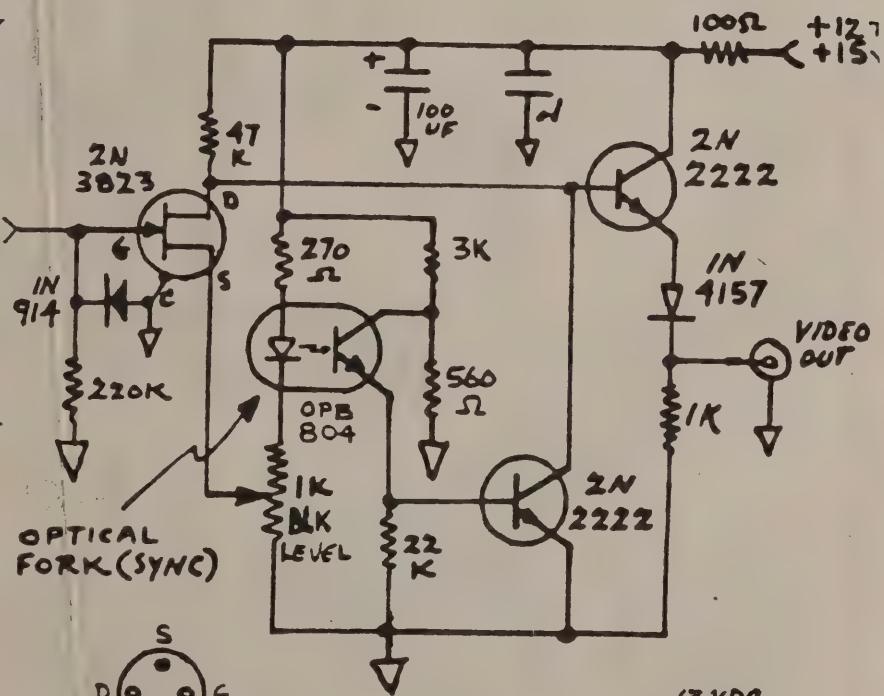
Peter YANCER  
319-822-1748

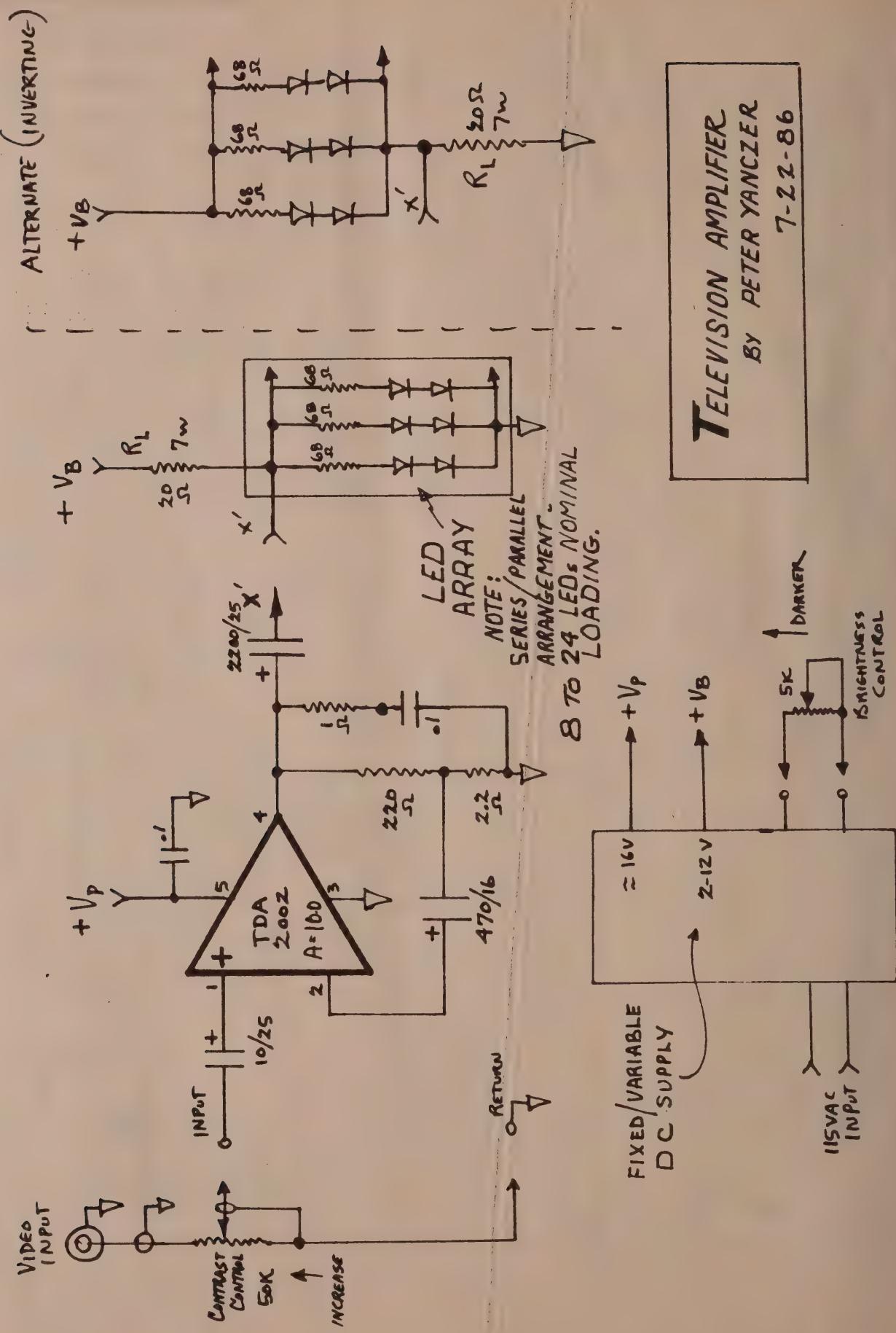


### NOTES:

- \* IF A OPTICAL FORK IS NOT USED, JUMPER THE ANODE/CATHODE TERMINALS.
- \* LEADS FROM THE PMT SHOULD BE KEPT AS SHORT AS PRACTICAL
- \* DO NOT MOUNT THE PMT NEAR THE POWER TRANSFORMER.
- \* THE PMT Supply VOLTAGE SHOULD BE ADJUSTABLE BETWEEN  $\approx 300$  AND  $750$  VDC
- \* Do Not Expose the PMT to Normal Room Lighting or Daylight With Supply Voltage Applied.
- \* Use SHIELDED WIRE for the Preamp Input and Output.
- \* To Prevent Shorting the Amplifier, MOUNT IT AT LEAST  $\frac{1}{4}$ " FROM A METALLIC SURFACE.
- \* Adjust the BLACK LEVEL CONTROL for BEST CONTRAST & Good HALF TONES.

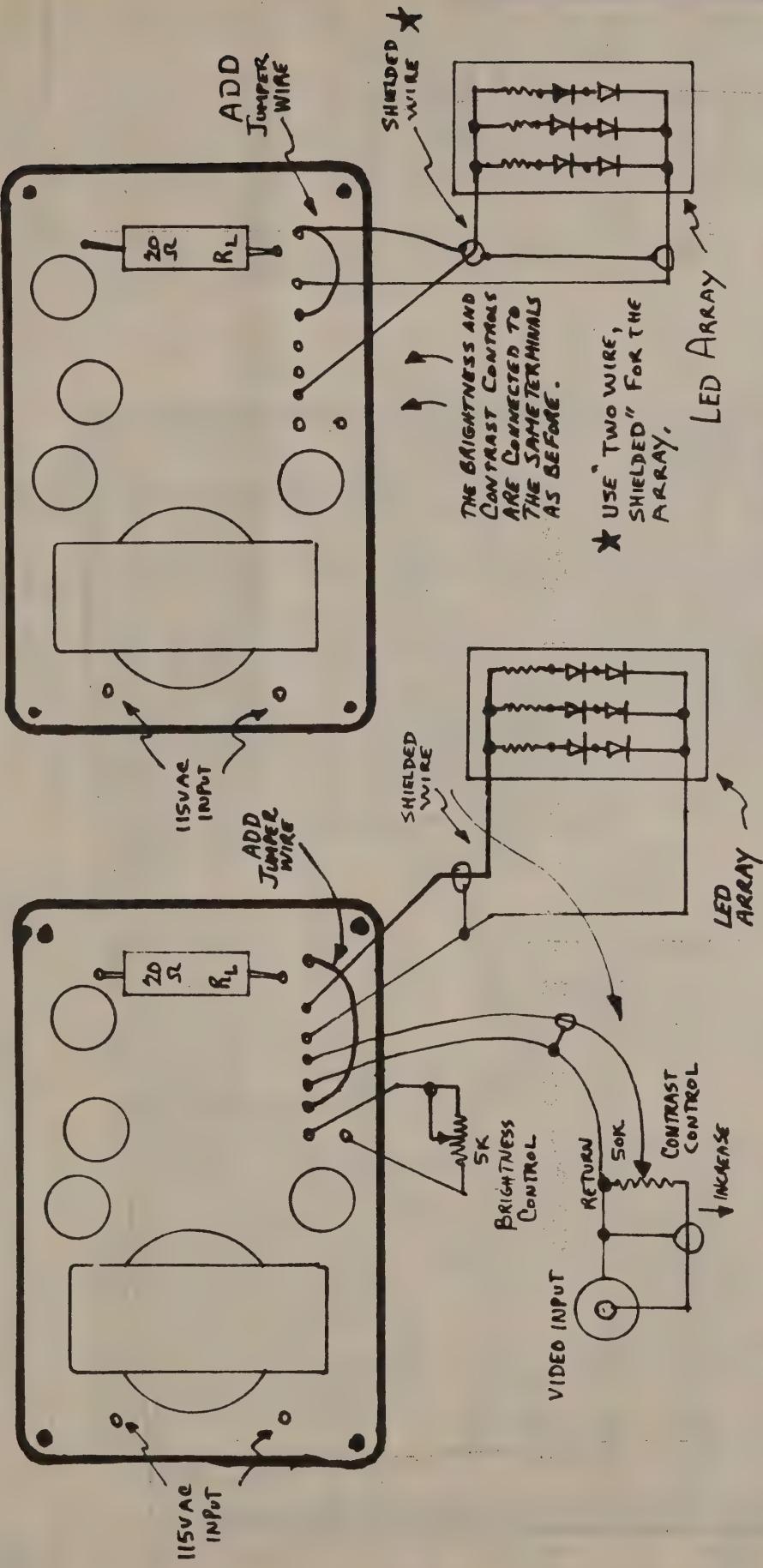
### PRE-AMPLIFIER DRIVER





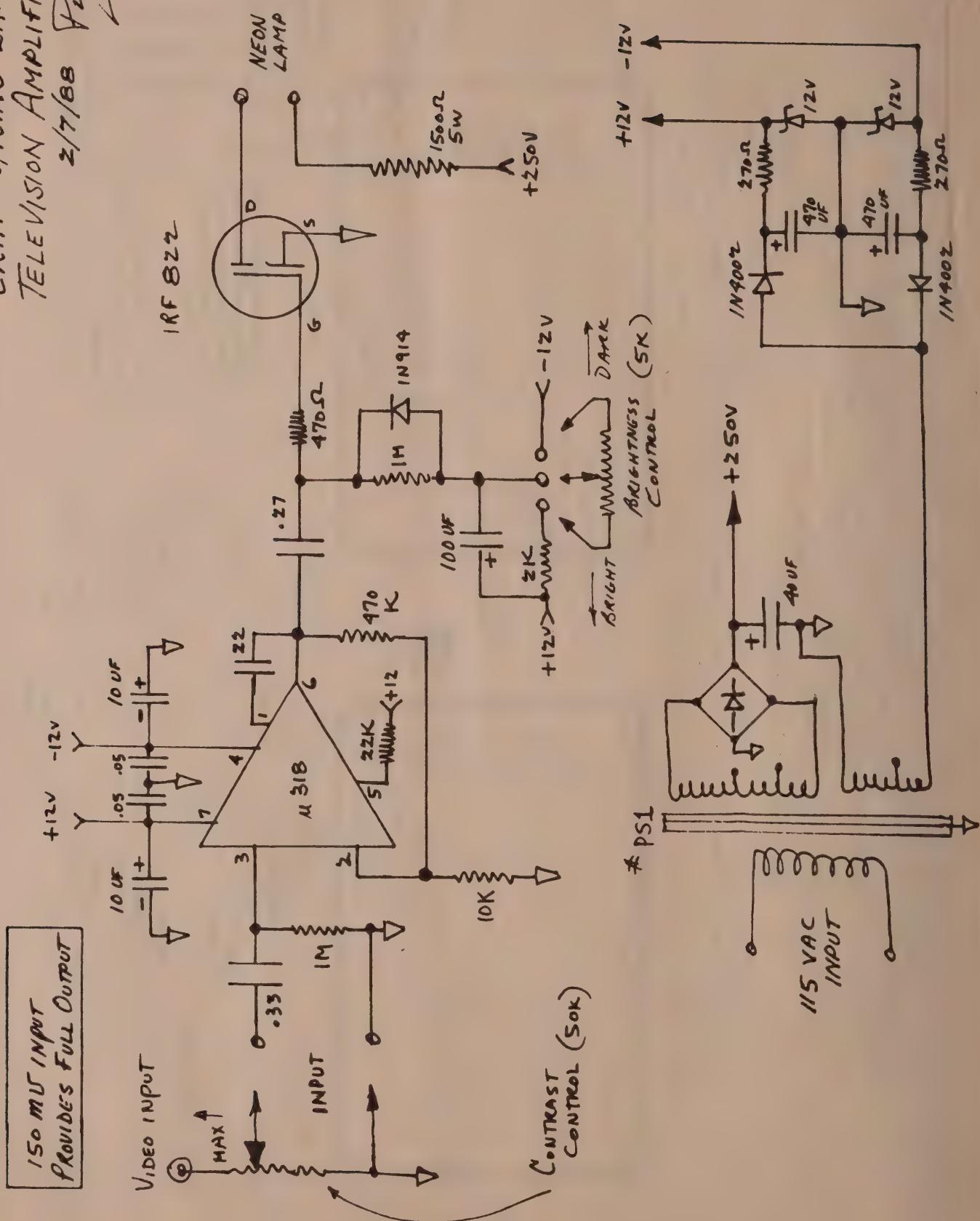
**TELEVISION AMPLIFIER**  
By PETER YANCZER  
Revised 4-27-88

ALTERNATE CONFIGURATION  
(INVERTED SIGNAL)



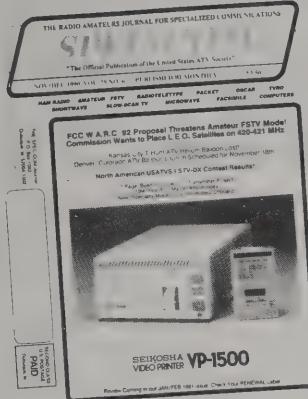
CRATER/KINO-LAMP  
TELEVISION AMPLIFIER  
2/7/68 Pg

2/7/88



# SPECIALIZED COMMUNICATIONS

FOR TODAY'S RADIO AMATEUR!



**HERE ARE A FEW MORE  
OF OUR 99 REASONS WHY  
YOU SHOULD BE SUB-  
SCRIBING TO SPEC-COM!**

24 Years of Publishing (including A5 ATV Magazine production) Since 1967. Covers ALL-MODES (not just ATV). Projects to Build, Circuit Design, Formation and Support of The United States ATV Society in January 1983 with 50 State Section Representatives and 6 Regional Directors. Regular Columnists: Editorial & Packet; Mike Donovan KAOJAW, ATV and Reviews; Mike Stone WB0QCD, Club Activity, Special Events & Contests; Dale Lam WAONKE, Video Q&A and Technical; Ron Hranac NOIVN, From the Workbench; Steve Franklin WB5KGL, Early TV & Radio; Mel Dunbrack W1BHF & James Hawes KB9EPQ, Low-Power TV; Harry Tootle WB7PVO and Microwave/TVRO; Mike Veldman WD0CTA, Slow-Scan TV and WEFAX; Fred Sharp W8ASF and Greg Mengell, RTTY AUTOSTART & Cartoons; Al LaVorgna WA2OQJ, ASK AEA; Al Chandler K6RFK, OSCAR, SPACE and NASA; Joe Holman KA7LDN, Computers, Modems & Packet; Rich Bono NM1D. Authors: Gerald Cromer K4NHN, Hap Griffin WA4JMU, Dave Palez AH2AR, Don Miller W9NTP, Rudy Graf KA2CWL, William Sheets K2MQJ, Steve Carroll WV0J, Robert Jeff W7KPW, Stas Andrzejewski W6UCM, Bob Spahn WD5BJW, Merle Reynolds W9DNT, Wayne Chandler N4KWC, Tom Harvey KA0ZRO and others. Photography by Max Gould K6GLG, Ron Hranac NOIVN & Rose Stone KAOSUT. Membership Services Access, Electronic Cottage BBS, USATVS Videotape Library, 2 Annual FSTV & 1 SSTV Contests, Dayton ATV Workshops, Back Issue & Article Reprint Service, Awards, Tremendous Industry Advertising Support, 6 times bi-monthly ON-TIME delivery and last but not least: ONE HECK OF A GREAT INFORMATIVE PUBLICATION!

**SPEC-COM Communications &  
Publishing Group, Ltd.**  
P.O. Box 1002,  
Dubuque, Iowa 52004

(319) 557-8791



## SPECIAL SUBSCRIPTION COUPON OFFER!

(Great Gift Idea for a Friend or Yourself!)

**NEW SUBSCRIBERS OR "EARLY" RENEWALS:** Fill out this coupon, cut it out and send us your check or money order for a ONE YEAR (or more) SUBSCRIPTION to Amateur Radio's #1 Specialized Communications Magazine: **THE SPEC-COM JOURNAL** (\$20.00 USA \$25.00 CANADA & MEXICO \$30.00 DX) and we will send you our 60-page USATVS NORTH AMERICAN ATV DIRECTORY GUIDE BOOKLET (\$6.95 value ppd.) ABSOLUTELY FREE! (Present Members: Submission must be minimum 3 months before actual renew deadline date). One FREE copy sent per member. Offer ends December 31st 1991.

NAME \_\_\_\_\_

CALLSIGN \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY/ST \_\_\_\_\_

ZIP \_\_\_\_\_

NEW  RENEWAL  SEND BOOK TO: \_\_\_\_\_

SPEC-COM Communications & Publishing Group, Ltd. PO Box 1002, Dubuque, IA 52001.

(Offer valid as long as supplies of remaining stock exist)

## Alpha Delta Model DELTA-2 and DELTA-4 Coax Switches

Setting "first in the industry" standards for lightning surge protection, precision low-loss switching and master antenna ground functions—all in a single, cost effective product.



- Arc-Plug® cartridge surge protection system—replaceable element provides continuous protection of the active antenna circuit. Unused circuits are automatically grounded. Easy access through front panel.
- Master antenna ground function—internally disconnects and grounds all circuits when in center "off" position.
- Efficient low-loss cavity design—uses constant impedance micro-strip construction for outstanding low-loss performance and state-of-the-art co-channel isolation. No lossy wafer switches are used.
- All connectors are across rear for best "out of the way" cable installation. Other brands use front-mounted "common" connectors which cause unsightly cable loops.
- Positive detent roller bearing drive for "no question" switch positioning.
- The Delta Series handles full legal power.
- Cheaper switches typically don't have N-type connectors because poor, non-constant impedance designs become obvious when using precision N connectors. One look inside cheaper switches will tell you they are still overpriced.
- Designed and produced in the U.S.A. by Alpha Delta.

**Model Delta-2 (2-position, UHF connectors, 500 MHz) ..... \$49.95**

**Model Delta-2/N (2-position, N connectors, 1.3 GHz) ..... \$64.95**

**Model Delta-4 (4-position, UHF connectors, 500 MHz) ..... \$74.95**

**Model Delta-4/N (4-position, N connectors, 1.3 GHz) ..... \$89.95**

At your Alpha Delta Dealer or add \$4.00 for direct U.S. orders. Exports quoted.

See Data Sheet for surge limitations.



**ALPHA DELTA COMMUNICATIONS, INC.**

P.O. Box 51117, Phoenix, Arizona 85076 • (602) 966-2200

*current solutions to current problems*



# GET THE LATEST ADVANCES IN ELECTRONICS

WITH A SUBSCRIPTION TO

ENJOY THE WORLD OF ELECTRONICS EACH MONTH!

P.O. Box 51866 BOULDER, COLORADO 80321

# Radio Electronics®



FOR FASTER SERVICE CALL TODAY  
**1-800-999-7139**

Now you can subscribe to the best electronics magazine. The only one that brings you articles on—electronics projects, technology, circuit design, communications, new products and much more.

Radio-Electronics looks to the future and shows you what new video, audio and computer products are on the horizon. What's more you'll find helpful, monthly departments such as Video News, Equipment Reports, Hardware Hacker, Audio Update, Drawing Board, Communications Corner.

## DON'T DELAY SUBSCRIBE TODAY!

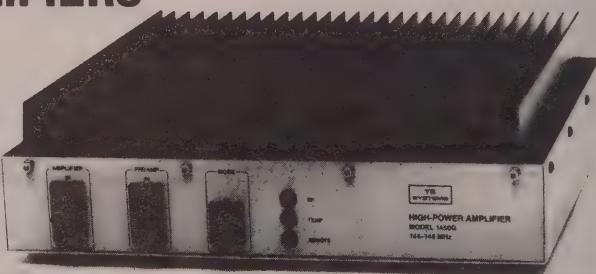
**TE  
SYSTEMS**

### RF POWER AMPLIFIERS

**NEW!**

**400 WATTS**  
(144-148 MHz)

175 Watt ATV Model  
430-440 Now Available!



#### SPECIFICATIONS

Model	Freq. MHz	Power		Preamp		DC +Vdc	Power A	RF Conn.
0550G	50-54	10	400	6	10	13.6	.00	UHF
0552G	50-54	25	400	6	15	13.6	.55	UHF
1450G	144-148	10	400	.8	15	13.6	.54	UHF
1452G	144-148	25	400	.8	15	13.6	.50	UHF
2252G	220-225	25	220	.7	14	13.6	.36	UHF
4450G	420-450	10	175	1.1	12	13.6	.34	N
4452G	420-450	25	175	1.1	12	13.6	.29	N

TE SYSTEMS new HPA Series of high power amplifiers now available through select national distributors.

All amplifiers are linear (all-mode), automatic T/R switching, and incorporate optional GaAs FET preamp. Amps are usable with a wide input drive level range. Thermal shutdown protection and remote control capability included. All units are designed to ICAS ratings and meet FCC part 97 regulations. Approx. size is 2.8 x 10 x 11.5" and weight is 8 lbs.

Consult your local dealer or send directly for further product information.

"A SPEC-COM/USATVS Supporter!"

**TE  
SYSTEMS**

**TE SYSTEMS**

P.O. Box 25845  
Los Angeles, CA 90025  
(213) 478-0591

Models also available without GaAs FET preamp (delete G suffix on model #). All units cover full amateur band - specify 10 MHz bandwidth for 420-450 MHz amplifier. Continuous duty repeater amps also available.

Amplifier capabilities: 100-200 MHz, 225-400 MHz, 1-2 GHz, Military (28V), Commercial, etc. also available - consult factory.

For our Model 4450 Series Hi-Power 175 Watt VHF Amp we recommend Astron's RM, RS-35 or 50 Power Supplies.

# OVER 45,000 PK-232s SOLD!

The AEA PK-232 multi-mode data controller remains the most widely used radio data controller **anywhere**. More hams own the PK-232 than any other radio data controller. And AEA's hard-earned reputation for quality and service keeps them coming back. The '232 gained its popularity with features like these:

## STATE-OF-THE-ART TECHNOLOGY.

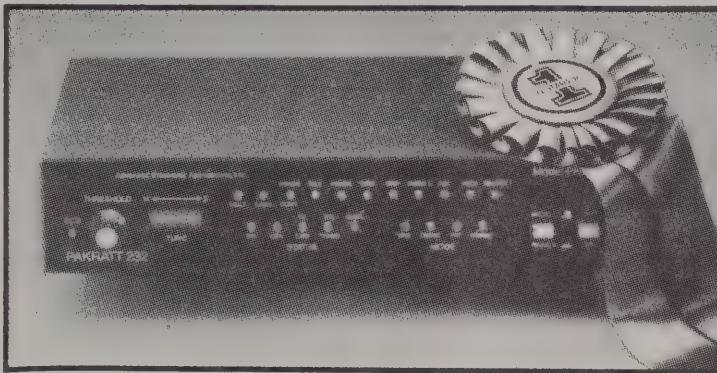
Since its introduction in 1986, the PK-232 has been updated six times to continue bringing you the breakthroughs. Six updates in four years! And even the very first PK-232 is upgradable to the latest model, with a relatively inexpensive user-installed kit. If you want a state-of-the-art multimode controller, you want the PK-232 MBX.

## ALL DIGITAL OPERATING MODES.

The PK-232 MBX includes all authorized amateur digital modes available today...Packet, Baudot, ASCII, AMTOR/SITOR (including the new 625 recommendation) and Morse code, as well as WEFA (receive and transmit). Other features include the PakMail 18K byte maildrop system with automatic normal and reverse forwarding, NAVTEX reception, KISS protocol support, binary file transfers and more. Also included is the TDM (Time Division Multiplex) mode for SWLing that few others have. No other multi-mode has all these features.

## SUPERIOR FILTERING

The 8-pole Chebyshev filter in the PK-232 was designed from the ground up to work on HF and VHF. We didn't just add some firmware to a Packet modem to create our multi-mode. Our modem was proven superior by tests in *Packet Radio Magazine* over all the others tested. Read the fine print! You just can't beat the PK-232 for performance, quality and integrity. 45,000 PK-232 owners can't be wrong!



The only data controller designed from the ground up to be a true multi-mode, the PK-232's tuning and status indicators work in all modes, not just packet. Make sure the multi-mode you buy isn't just a converted Packet TNC. There's only one number 1!

## SIGNAL ANALYSIS.

The first multi-mode to offer SIAM (Signal Identification and Acquisition Mode) was, of course, the PK-232MBX. Indispensable to SWLers, SIAM automatically identifies Baudot, ASCII, AMTOR/SITOR (ARQ and FEC) and TDM signals, then measures baud rate and polarity. Once the PK-232MBX is "locked on" to the signal, a simple "OK" command switches to the recognized mode and starts the data display. You're even ready to transmit in that mode if applicable. The PK-232MBX makes SWLing easy and fun, not difficult and frustrating.

## INNOVATION

The PK-232 has been the one to follow for technology advances. It was the *first* radio data controller with weather-fax, the *first* with Host mode, the *first* with NAVTEX, the *first* with Signal Identification, the *first* with TDM, the *first* with AMTOR v.625, the *first* with a WHYNOT command, etc, etc. AEA has always strived to "Bring You The Breakthrough," and while others have tried to imitate, only one can be the best.

## HOST MODE

Many superior programs have been written specifically for the PK-232 in Host mode language: NEW PC-Pakratt II for IBMs and compatibles, updated MacRATT for Apple Macintosh, and ComPakratt for Commodore C-64 and C-128 computers.

## REPUTATION

The PK-232MBX has helped AEA establish its hard-earned reputation for producing high quality amateur radio products. Anyone can say they have a good reputation, so it pays to ask around. Listen on the HF bands and see which multi-mode is getting used. You owe it to yourself to get the best possible value for your money. Don't settle for less!

*Watch for the DSP-1232 and 2232 coming soon!*



**AEA Brings You a Better Experience.**

**Advanced Electronic Applications, Inc.**

2006-196th St. S.W./P.O. Box C2160 Lynnwood, WA 98036 (206)775-7373.

Prices and specifications subject to change without notice or obligation.

© Copyright 1990 by AEA, Inc. All Rights Reserved.

# STEP INTO THE 90's .... on VHF/UHF with MIRAGE/klm

Products available at Ham Radio Equipment Dealers Worldwide



We have all that you need to enhance your ATV FM FAX SSB RTTY PACKET & OSCAR communication signals! All products factory tested & ready to ship. Write or call today for our FREE product catalog!

Our **MIRAGE VHF/UHF RF Power Amplifiers** have been proven for reliability and performance. On 70 cm, our UHF models; D-15, D-26, D100-ATVN and D1010-ATVN are specially designed, high-power amplifiers suitable for both wideband TV & narrowband FM/SSB signals. Our 2 Meter model RF amps; B-108G, B-10/3016G and B-3016, 3030, 5016 & 5030 will e-x-t-e-n-d your VHF operating range considerably! We manufacture specially built, heavy-duty heatsinked amplifiers for REPEATERS and REMOTE TRANSMITTERS. Measure your high-power output and VSWR with our new **MP2 WATTMETER**! Boost VHF/UHF receive signals and reduce coaxial cable loss with our in-shack (100 watts of transmit through switching) or mast-mounted (160 watts) **PREAMPLIFIERS** for 28-30, 50-52, 144-148, 220-225 and 420-470 MHz. All our **PREAMPLIFIERS** give you more than 20db gain with less than 0.6db noise. Our vast array of rugged, quality, factory made antennas for HF/VHF and UHF can't be beat on both price & performance. We also carry **POWER DIVIDERS**, **STACKING FRAMES**, **ROTORS**, **SATELLITE TRACKING SYSTEMS**, **ANTENNA & POLARITY SWITCHES**. We're proud to be a SPEC-COM Journal & USATVS Commercial Advertiser Supporter. STEP INTO THE 90's by getting in touch with us today!



Model 435-40 CX  
"Winning Antenna"  
1990 SPEC-COM/USATVS  
N.A. FSTV DX Contest  
Bud Leas KF0FQ  
159,000 Points

**MIRAGE/klm**  
P.O. Box 1000,  
Morgan Hill, CA. 95038  
(408) 779-7363

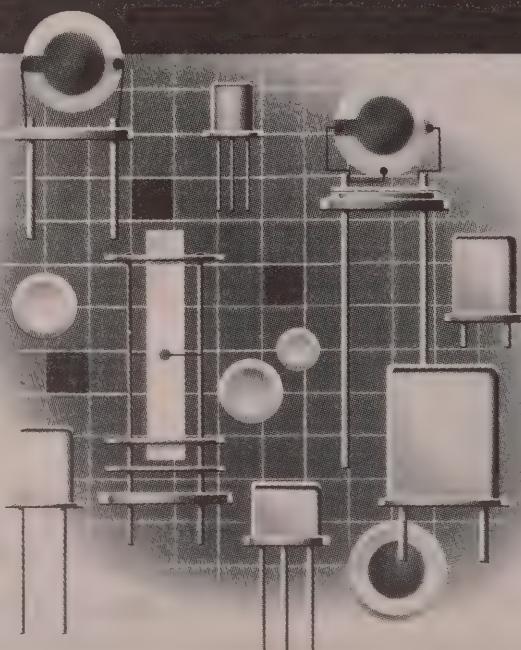
# CUSTOM CRYSTALS

## Crystals for many applications

For over 40 years, ICM has manufactured the finest in quartz crystals for every conceivable purpose.

A wide selection of holders are available to fit most any requirement. Our computer database contains crystal parameters for thousands of equipment types.

Need crystals for communications, telemetry, industrial, or scientific applications? Let ICM's sales department assist you to determine which type of crystal is best for you.



## Can we solve your crystal problem?

For special purpose crystals, special holders, special sizes, call our crystal sales department. We will be pleased to provide recommended data.



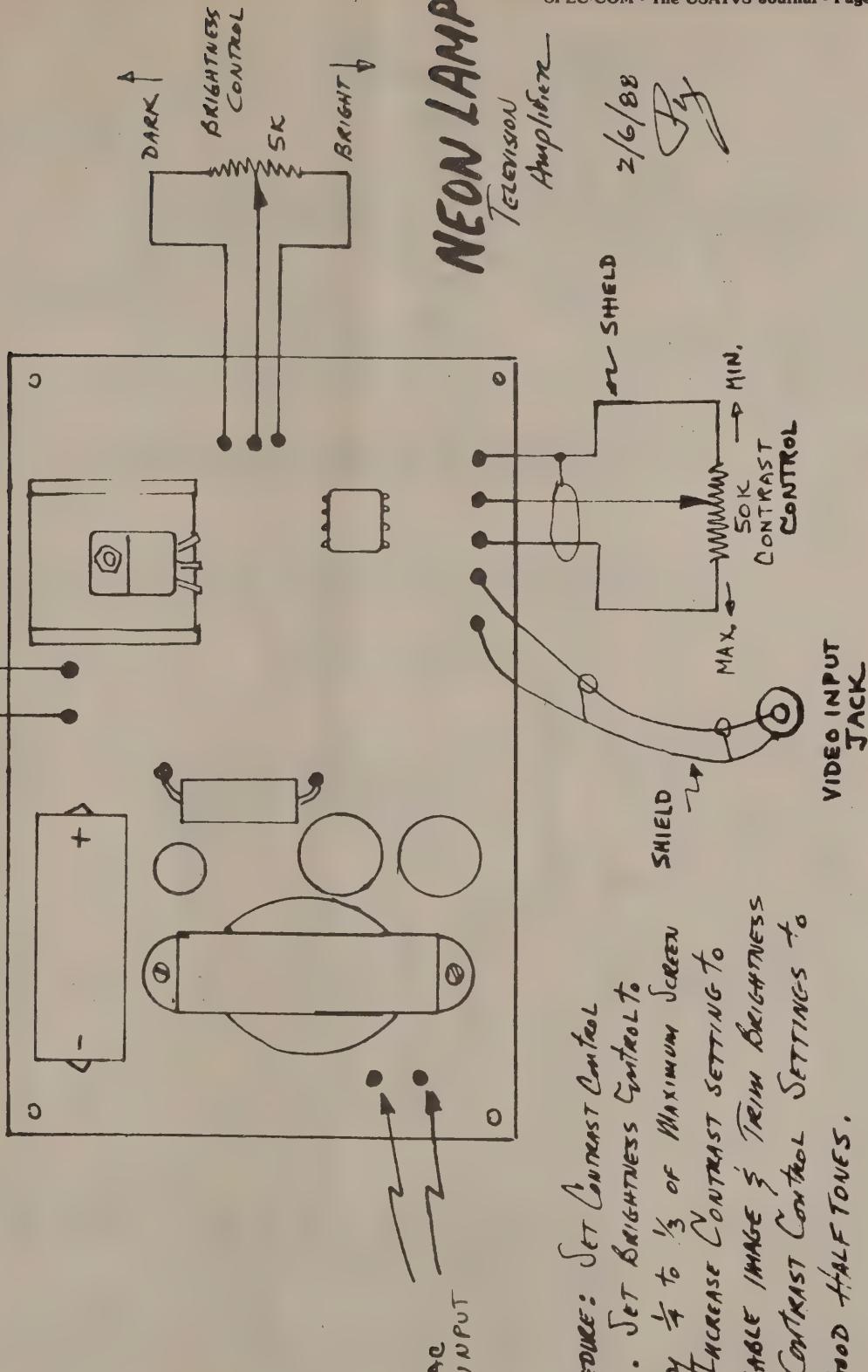
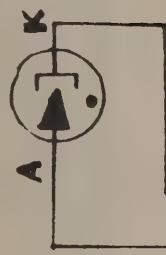
**International Crystal  
Manufacturing Co., Inc.**

P.O. Box 26330, 701 W. Sheridan  
Oklahoma City, OK 73126-0330  
Phone (405) 236-3741, Telex 747-147  
Facsimile (405) 235-1904

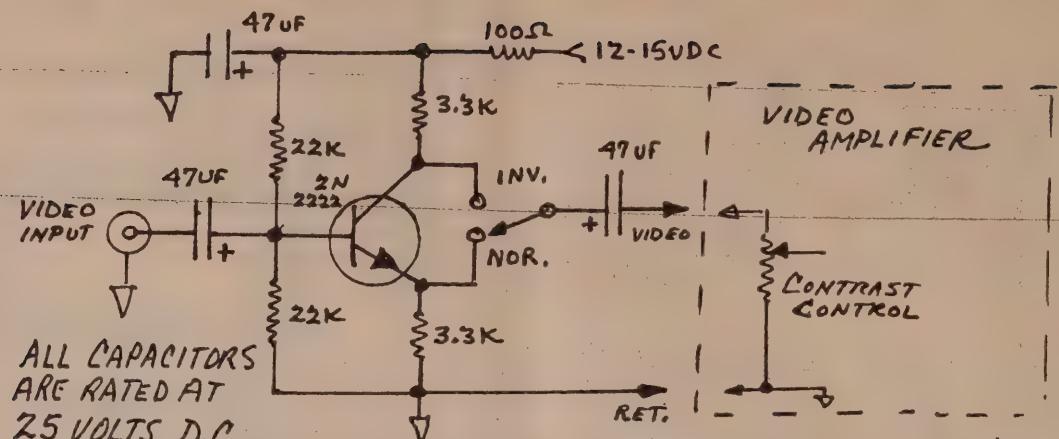
## CIRCUIT OR KINO-LAMP

Note: Reverse Lamp Connections  
If Necessary

**CAUTION!**  
250 VOLTS

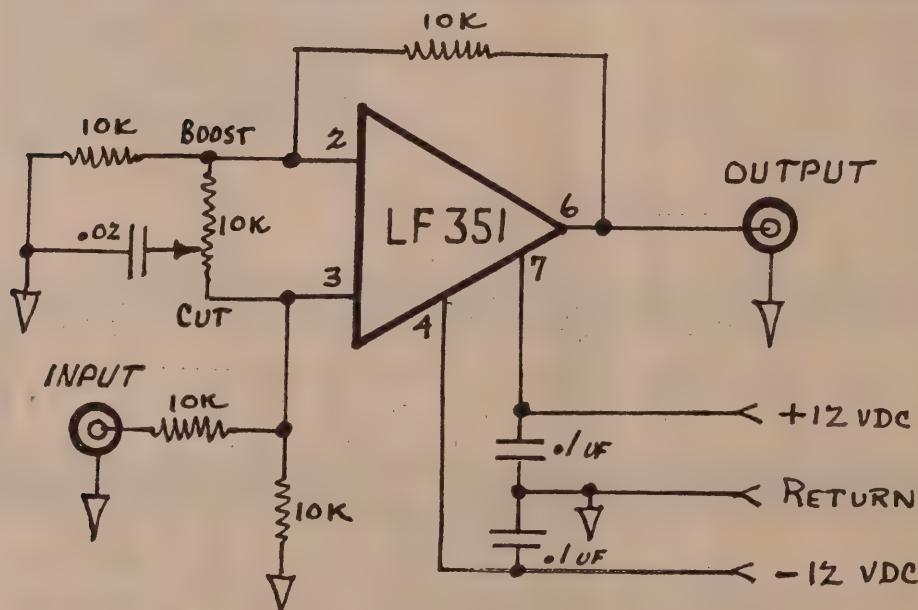


Adjustment Procedure: Set Contrast Control to Minimum. Set Brightness Control to approximately  $\frac{1}{4}$  to  $\frac{1}{3}$  of Maximum Screen Brightness. Increase Contrast Setting to Viewable Image of Trim Brightness. Control of Contrast Control Settings to Produce Good Half Tones.

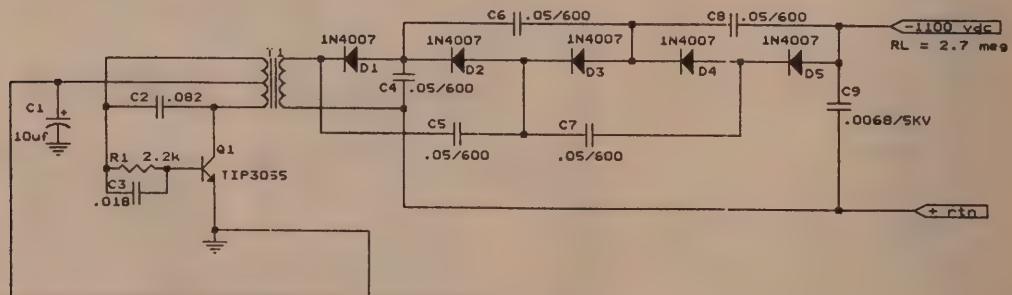


5/1/88  
P.24.

# HIGH FREQUENCY BOOST AMPLIFIER

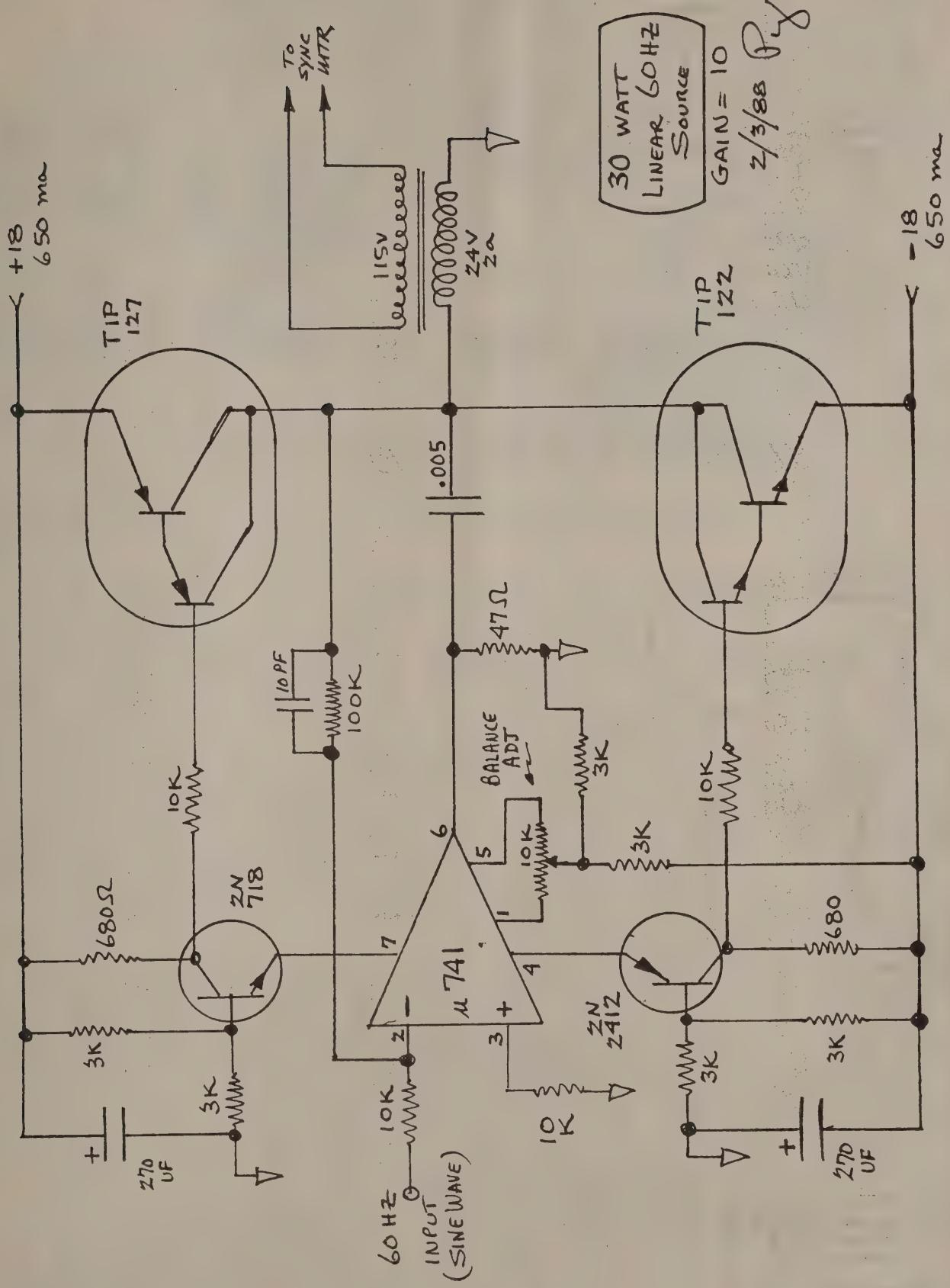


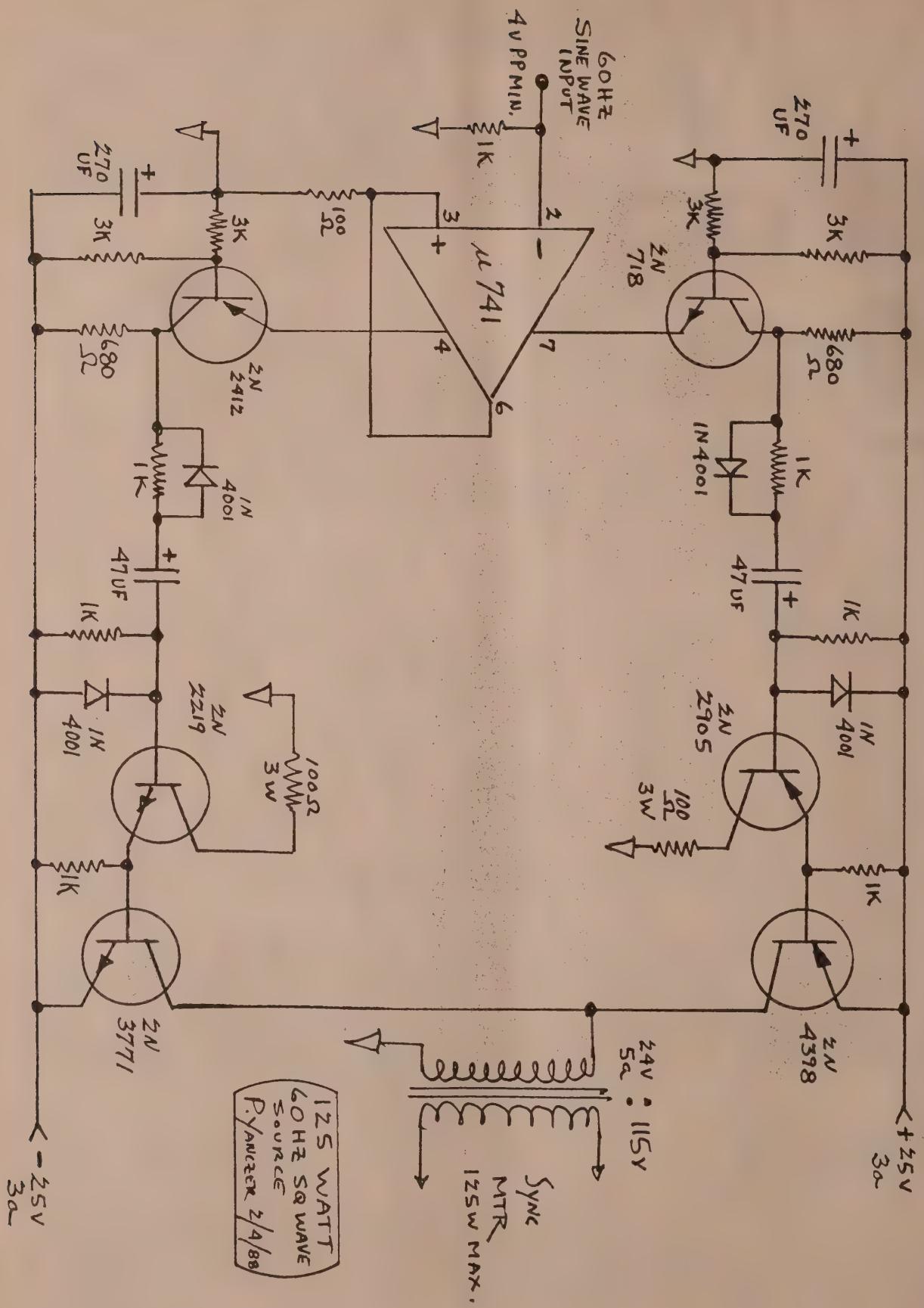
### PMT POWER SUPPLY



T1... PRI= 100TURNS, CT #31  
SEC= 1150 TURNS #37  
CORE= FERRITE CLIP

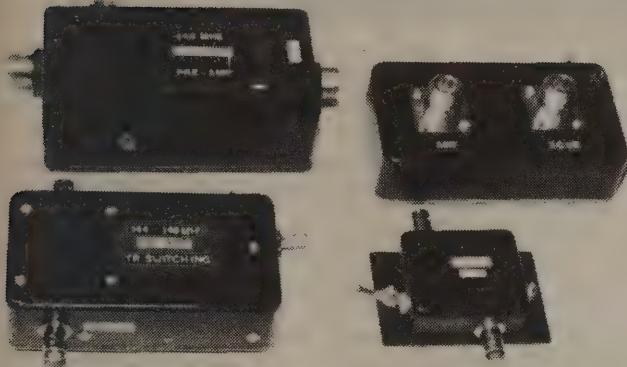
T2... 26VCT/.2s







210 Utica Street Tonawanda, NY 14150 (716) 692-5451



**VIDEO SAMPLER Model PD-VD-1** - Reviewed in the MAR/APR '91 issue of SPEC-COM, this unit picks up your transmitted ATV signal by sampling the transmission line. Negligible insertion loss. It uses 2 Type 'N' connectors for input/output. BNC used for video tap. Detected output is connected to your monitor and/or scope for accurate transmitter video and sync level adjustments. Two available models, both will relative output meters. One has greater accuracy. Two PC controls, one for video and the other for power output. This beats an on-air adjustment! \$65.00

**NEW INTERDIGITAL FILTERS ADDED TO LINE!** 7-pole, 7 adjustable tuning rod design. Frequency adjustable to 6 MHz by simple rotation of screws at the end of each rod. Insertion loss: less than 1 dB. Out of band attenuation: >80 dB +/- 12 MHz from the VSB passband. Attenuation at the LSB sound subcarrier: 30 dB.



VIDEO SAMPLER Model PD-VD-1

#### PREAMPLIFIERS

**PD-144E** is a 144 to 148Mhz. dual gate low noise preamplifier (0.6 - 0.7db.) with a gain between 18 & 20db. It uses a NEC 41137 or equivalent transistor. It has a tuned input only, using 2 ceramic capacitors. The drain output has a load resistance and a cap. output. This gives a low noise performance. The unit comes with either BNC or SO-239 connectors. Supply voltage should be between 12 and 13.8 volts. It has a 5 volt regulator in the unit and is diode protected. Antenna input is also protected by reverse diodes. .... \$41.00 & \$46.00

**PD-144TR** A T/R switched unit is also available and will handle a max power of 35 Watts. .... \$69.00

**PD-144TR-L** is a preamplifier which will handle 100 watts through and has diode protection during the relay switching time. Grounded relay contacts are in the unused poles while the preamplifier is in service. The preamplifier is automatically switched out of the circuit when RF is detected during transmission time. Most of the units have a 1 to 1.5 second delay unless you desire fast switching service. It is in a wx resist painted diecast box with installation for a connector down position to help reduce contamination. The box is sealed so that water should not be a problem. SO-239 connectors are normally used, but "N" may be requested. We custom build the mounting bracket and clamp so that it can be either mast or boom mounted. .... \$119.00  
FOR VOLTAGE FEED THRU COAXIAL CABLE .... \$139.00

**PD-220E** for the 220Mhz. band is the same as PD-144E .... \$39.00 & \$44.00

**PD-440S** 70cm. 426 to 450Mhz. preamplifier is a SINGLE GATE type using either a NEC 2SK-571 or a Mgf 1302 transistor. Noise figure is 0.6db. and has a gain of 16db. or better. It operates from a 12 to 13.8 volt supply, is diode protected and has a 5 volt regulator for stability. The source leads are by-passed with disc capacitors and the input uses a high "Q" piston Trim Pot. The output is not tuned so that the noise figure is consequentially low. A Toroid is used in the output, with capacitor coupling to the output. In this model either BNC or "N" connectors are used. .... \$49.00 & \$51.00

**PD-440TRL** is a tower mounted 70CM. preamplifier whose description is similar to that of the PD-144TR-L except has "N" connectors. .... \$119.00  
FOR VOLTAGE FEED THRU COAXIAL CABLE .... \$139.00

**PD-900** is a 902-928Mhz. preamplifier with a noise figure of 0.6 to 0.7db. and a Gain of 14 to 16db. With BNC. .... \$60.00  
"N" Connectors .... 68.00

**PD-900TR** is a R.F. sensed preamplifier and can be transmitted through with a maximum power of 20 Watts. .... \$119.00

**PD-1200** and **PO-1200**. SAME AS THE PD900 .... \$60-68 & \$119.00

**PD-2300** is for the frequency range of 1.8-2.4Ghz. .... \$72.00  
No T/R Switching Capability.

FOR ADDITIONAL INFORMATION SEE CATALOG OR SEE ONE OF OUR VENDORS.

#### Special Prices on Many Products

**WARRANTY IS 1 YEAR ON LABOR AND 6 MONTHS ON PARTS (SEE OUR GUARANTEE FOR THE EXCEPTION). YOU MAY RETURN ANY UNIT WITHIN 30 DAYS IF YOU ARE DISSATISFIED OR IF THE UNIT DOES NOT PERFORM TO YOUR SATISFACTION.**

<b>BRICKS:</b> SAU-11 900 MHZ, \$19.00; on wired P.C. Boards	\$25.00
M57762 1.2 Ghz. \$72.00; on wired P.C. Boards	99.00
SAU-4 440 Mhz. on wired P.C. Boards 18W. ....	86.00
M57745 440 Mhz. on wired P.C. Boards 35W. ....	120.00
SAV-7 144 - 148 Mhz. wired P.C. Boards 35W. ....	89.00
M57727 2 mtr. Linear wired P.C. Boards 35W. ....	98.00

#### POWER AMPLIFIERS:

144 - 148 Mhz. PD-144 F.M. 35 watt output (2W. in) T/R	\$109.00
SAME with preamplifier .....	129.00
PD-144N-1 Linear 35 watt output T/R .....	125.00
PD-144N-2 F.M. 60 watts (2W. in) T/R .....	159.00
WITH PREAMPLIFIER .....	\$179.00
225 Mhz. PD-220N F.M. 35 Watts output (2W. in) .....	123.00
426 - 450 Mhz. PD-440N Linear 18 watts output (2W. in) .....	119.00
PD-440N-1 Linear 35 Watts out (2W. in) .....	155.00
Same with Preamplifier .....	173.00

**NEW:** Linear P.A. (Mini) 100MW. = 1W. & 1W. = 6W. .... \$55.00 - \$65.00

**ABOVE FOR 70 Cm. Band. LETS YOU GET FULL POWER FROM YOUR LARGE P.A. AS AN IN BETWEEN AMP. PRODUCES GOOD VIDEO & COLOR ON ATV.**

902-928 Mhz. PD-900 DOUBLER 70 CM. = 33CM. ....	\$45.00 & \$85.00
Above $\frac{1}{2}$ W. in $\frac{1}{2}$ W. or 1 W. out.	
PD33VLB mini Amplifier (1W. = 1.5W. ....	\$49.00
PD-900N F.M. $\frac{1}{2}$ W. = 10W. ....	\$50.00 or \$65.00
Above may be used on ATV with 2 to 3 watts output.	
PD-33LP 1W. in = 6-7W. output .....	\$99.00
PD-33HP 5 W. in = 16W. output .....	119.00
PD-33LHP 1W. in = 17W. output .....	210.00
1.2 Ghz.	
PD-1200N 1W. in = 18W. output .....	\$149.00 & \$165.00
PD-1200TR 1W. in = 16W. output T/R .....	195.00
PD-1200N-1 2W. in = 36W. output .....	285.00
Above P.A. has a P.C. Board Combiner	

2 mtr. & 70 CM

**DUPLEXED POWER AMPLIFIER:** 35W. out on 144-148 Mhz. .... \$225.00  
18W. out on 440Mhz.  
Input power 2 watts.

**DUPLEXERS:** 70 CM & 2 Mtr. (100W.) .... \$25.00

**ATTENUATORS:** (ALL BANDS) R.F. .... 6.00

**ATV SAMPLERS:** \$45.00 \$60.00 \$65.00

**FM Audio Transmitters & Receivers (Single Frequency)**

**TRANSMITTERS** 1W. output 902-928 Mhz. less xtal .... \$239.00

**RECEIVERS** FOR 902-928Mhz. less xtal .... 179.00

**KITS FOR 2 METERS, INQUIRE**



# Cathode Glow

EARLY TV AND RADIO • by James T. Hawes, KB9EPO

8611 Kedvale Avenue, Skokie, IL 60076

## Less Is More

Photo by Jean, KB9FXL

One of the great charms of mechanical television (*MTV*) is *simplicity*. In fact, an MTV receiver is only about as complicated as an electronic phonograph. Looking in the back of an MTV receiver, you can actually *see* how it works. How many of us can do that with an electronic television set? *Let's climb in the time machine and check out Grandfather's vintage set...*

## What Makes It Go?

My now youthful Grandfather greets us with a friendly nod. Today he seems very animated. We understand, since he doesn't

encounter too many time travelers. Despite the Great Depression, Grandfather's a gracious host. He immediately gestures us to chairs. But then, all business, he launches straight into his spiel.

"This is my television receiver. I built it myself!" He beams with pride. He turns the set around. "Now, a television receiver often has three shelves inside it. The bottom shelf holds A, B and C batteries to power the resistance-coupled television amplifier. If the set's line-powered, we put the power supply there. On the top shelf is the resistance-coupled amplifier and neon kine tube. The middle shelf holds this large, universal motor.

That's the kind with brushes. I salvaged mine from a cast-off fan. This motor directly drives our scanning disc, which I attached to its shaft.

"Notice how I use a surplus tuning-dial knob to fasten the disc to the shaft. Now let's take a look and see if I

did a good job!"

Grandfather flips a switch on the side of the scanner. With a low whoosh, the disc spins up to speed.

A dim, recog-

nizable but grainy picture flits onto the tiny screen. We squint to watch it as Grandfather continues. "While viewing, you make coarse speed adjustments with this rheostat in series with the motor. The rheostat permits you to sync the televiser with transmitter motors running at different speeds. Since several "standards" exist, variable speed is a big advantage."

"Incidentally, some manufactured receivers add a little refinement: They incorporate automatic sync circuits! Other store-bought sets have sync motors, but these can only sync to local shows. Wide-area, synchronized power grids don't exist yet. Furthermore, power companies serve many areas with DC instead of the AC required by sync motors."

"Back to our set with the variable-speed motor... Sometimes the receiver disc runs out of step with the transmitter disc. See here... The bottom of this image appears at the top of our frame! But we can fix that in a jiffy. By tapping this pendant switch wired across the rheostat, I jog the motor a bit."

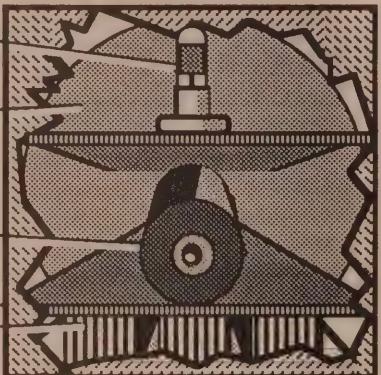
Grandfather nudges the button with his thumb. Cooperatively, the picture snaps back into frame. This adjustment takes about as much effort as adjusting the tracking on a 1991 videocassette recorder.

## Typical MTV Receiver (Back View)

Top Shelf:  
Neon Kine Tube  
(Amplifier not shown)

Middle Shelf:  
Universal AC/DC Motor

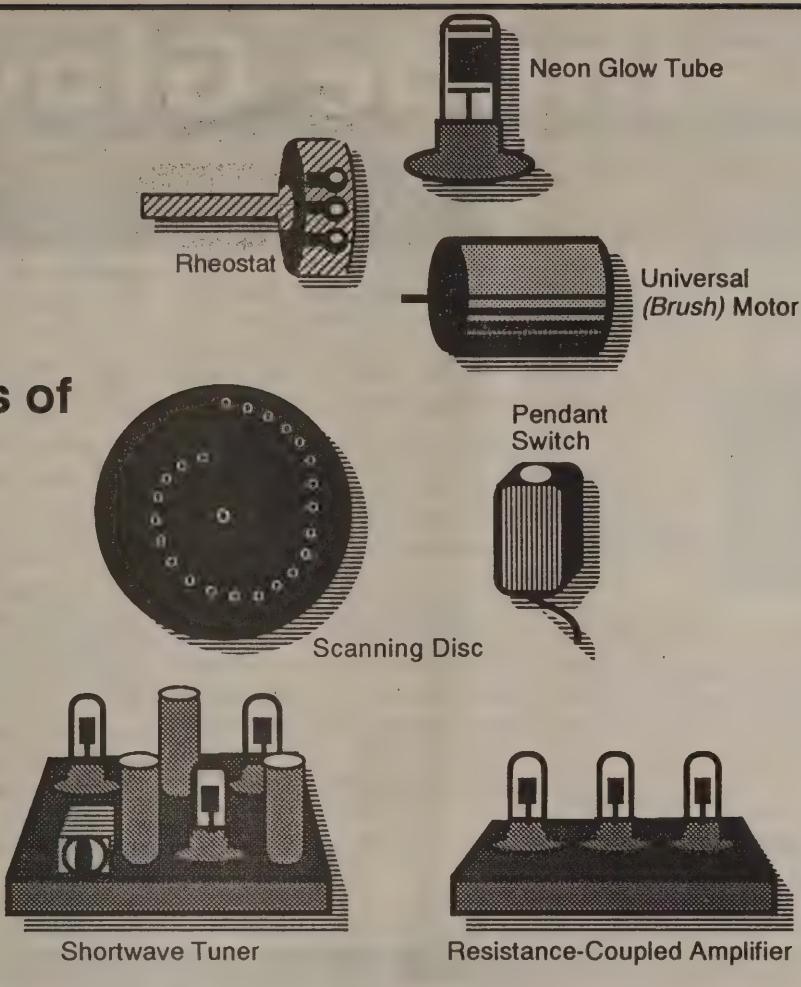
Bottom Shelf:  
Batteries



## Adjusting Your Mechanical Television Set

Symptom	Problem	Dr. Bentpixel's Remedy
Picture flips to the left	Motor's running slightly too slowly	Increase motor speed with rheostat.
Picture flips to the right	Motor's running too rapidly	Reduce motor speed with rheostat.
Picture tears	Motor's hunting	Motor may be inadequate.
Vertical frame line in mid-picture	Motor slightly out of step with transmitter	Move neon tube sideways until line vanishes.
Horizontal frame line in mid-picture	Motor out of phase with transmitter	Jog frame into position with pendant switch.
Black streaks in image	Dust in disc holes	Clean disc.
Uneven raster illumination	Disc holes incorrectly positioned	Try a new disc.
Negative picture	Wrong number of stages in preamplifier	Add or subtract one amplifier stage.
Backwards and upside-down image	Front and back of disk reversed	Flip disc and resecure it to motor.
Two half-wide pictures onscreen	Receiver disc has half as many holes as transmitter disc	Try a new disc, or stretch one of the images with a 45-degree mirror.
Sideways image	Receiving vertically scanned transmission on horizontally-scanned receiver	Cut a new viewing aperture 90 degrees around the disc from the original one.
Ghost images	Multipath reception, probably due to ionospheric conditions; possible bad cable or circuitry	Move antenna or install directional antenna; swap-check amplifier, tuner and cable.

## Components of Mechanical Television



Mechanical television receivers develop other problems as well. When he has a rare television question, Grandfather calls on television expert Dr. Bentpixel. According to the eminent Dr. Bentpixel, most MTV problems are no sweat to set right...

**The left side of the frame appears on the right:** "Your receiver disc is out of step with the transmitter disc," observes Dr. Bentpixel. "Move the neon tube left or right a tad."

**An unevenly-illuminated raster** means that you drilled your scanning disc unevenly."

**A streaky image** means that you have dirt in your disc holes."

**An upside-down picture** indicates that the disc is on backwards."

**You receive negative pictures.** But "these, too are fairly easy to correct," notes a grinning Dr. Bentpixel. "Just add a stage to your reamplifier!"

"Also remember that grid-leak detectors invert the incoming signal. Consequently they require an odd

number of preamp stages. Biased detectors don't invert the image: Use an even number of stages."

**Ghosts haunt MTV images** just as they do with contemporary television. (Dr. Bentpixel winks. "Some things never change.") Ionospheric conditions cause ghost images," Dr. Bentpixel declares. "They're just a part of skywave reception, I'm afraid.

"But you can reduce ghosting. Usually I recommend moving your antenna or trying a directional antenna. Improper impedances in your antenna feeder, tuner or RC amplifier might also cause ghosts."

### MTV Advantages

Returning to the 1991, we ponder a new topic: Advantages. Sure, MTV is ancient technology! Sure, the pictures are coarse-grained! Yet MTV has several advantages, even now...

**Fewer Active Parts.** MTV requires about six fewer tubes than a common tube set. This figure doesn't even include the picture tube. In semiconductor terms, this

figure translates to hundreds fewer transistors, or a fraction of the integrated circuits.

- Fewer Passive Parts.** Furthermore MTV sets incorporate fewer expensive and failure-prone capacitors than ETV (electronic television) sets do. The same applies to coils.

- Edge Sharpness.** Unlike CRT pictures, disc MTV pictures have equivalent resolution all across the frame. CRT's are sharpest in the center.

- Deflection.** Unlike ETV sets, MTV sets require no horizontal or vertical sync circuits. The scanning motor handles sync, as well as deflection. (However MTV sets may require view-

ers to adjust sync.)

- HV Supply.** MTV sets don't include expensive and hazardous CRT high-voltage power supplies.

- Expense.** MTV parts are comparatively inexpensive.

- Repairs.** Viewers can perform many repairs to MTV sets. Replacing the neon tube or tightening the disc aren't terribly difficult tasks. (Most viewers are lost inside an ETV set!)

- Bandwidth.** MTV signals occupy only a fraction of the bandwidth of fast-scan television signals. MTV shares this advantage with slow-scan television. However MTV involves full motion and doesn't require scan converters. Its bandwidth can measure between one and one-tenth percent of an ETV band.

- Color.** MTV color signals aren't multiplexed. They're discrete, clean and clear. They don't interfere with luminance information. Grandfather had no use for comb filters!

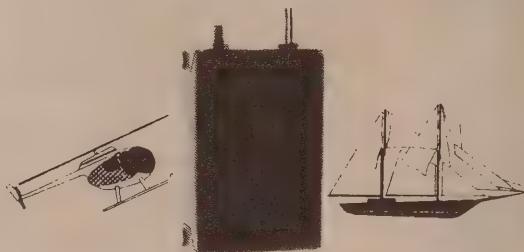
## Micro-Video Camera SMALL SIZE 2"x3"x1

Feather Weight 4 oz.

NTSC Output 240 TV Lines

Low Light 2 Lux 7-15 VDC/<100ma.

Typical Applications: ATV, Robotics, Computer Vision, Security, Remote Monitoring, Phone Vision



Factory New \$ 299.95  
NOW ATV Special  
2 or more \$ 279.95 ea.

Add \$5.00 S/H Ca. add 6.75%

### Micro Video Products

1334 So. Shawnee Dr. • Santa Ana, CA 92704  
1-800-473-0538 (714) 957-9268

RUTLAND ARRAYS

Proudly Announces

THE

## FO22-ATV

MEASURED GAIN >14.8 dBd FROM 420 TO 450 MHz

Model: FO22-ATV



ELECTRICAL SPECIFICATIONS:  
Gain peak ..... 15.8 dBd (436 MHz)  
VSWR ..... < 1.33:1 415 to 450 MHz  
E-Plane beamwidth ..... 23 Deg.  
H-Plane beamwidth ..... 24 Deg.  
Sidelobe attenuation .....  
1st E-Plane ..... -17.5 dB  
1st H-Plane ..... -15.5 dB  
Maximum power ..... 1500 Watts  
F/B ratio ..... 22 dB  
Impedance ..... 50 ohm

MECHANICAL SPECIFICATIONS:  
Length ..... 14 Ft.  
Boom ..... 1" OD 6061 T-6 Al  
Elements ..... 3/16" Al rod  
Mast ..... up to 1.5" dia.  
Wind surface area ..... .78 Sq.Ft.  
Wind survival ..... 90+ MPH  
All Stainless Steel Element Hardware  
Coax connector ..... N-type  
Polarization: Horizontal or Vertical

### ALSO AVAILABLE

RA4-50, RA7-50, RA8-2UWB, FO12-144, FO15-144, FO16-220,  
FO22-432, FO22-ATV, FO25,432, FO33-432, FO22-440  
POWER DIVIDERS ..... STACKING FRAMES

WRITE FOR INFORMATION ON OUR  
COMPLETE LINE OF VHF/UHF HIGH  
PERFORMANCE YAGIS

AVAILABLE FROM  
WYMAN RESEARCH  
OR

RUTLAND ARRAYS  
1703 Warren St.  
New Cumberland, PA 17070  
(717) 774-5298 7-10 pm EST

*Designed specifically for amateur television in the 70cm band...*

# FL407 INTERDIGITAL FILTER

**7-Pole Interdigital Vestigial  
Sideband Filter for Frequency Ranges  
of 420 MHz to 440 MHz**

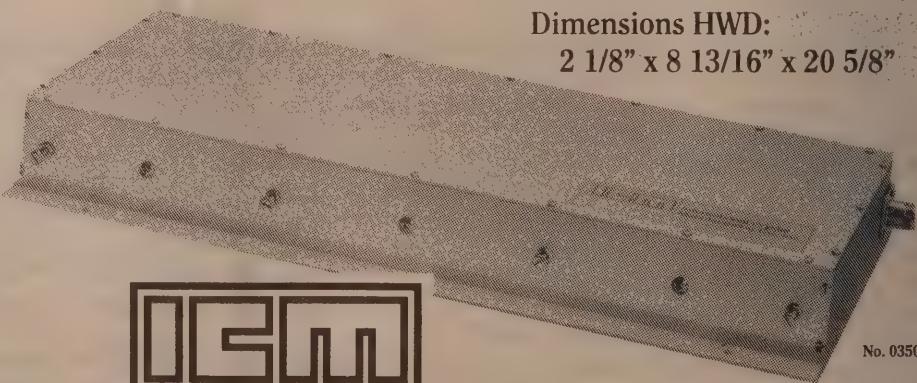
The 6 MHz nominal bandwidth and low loss design are perfect for transmitter or receiver use. Two filters can be used for repeater applications.

Heavy duty construction insures stable operation and long life.

Ordering Information: The FL407 may be ordered on any frequency between 420 and 440 MHz. Please specify video carrier frequency when ordering.

Dimensions HWD:

2 1/8" x 8 13/16" x 20 5/8"

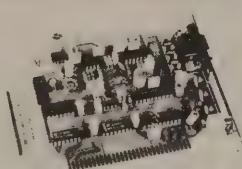
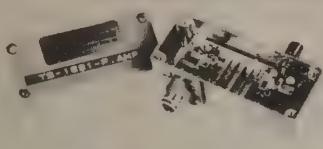


No. 035026

**International Crystal Manufacturing Co., Inc.**

P.O. BOX 26330 • 701 W. SHERIDAN • OKLAHOMA CITY, OK 73126-0330 • (405) 236-3741 • FAX (405) 235-1904

# 1691 MHz Weather Satellite System



Spectrum International, Inc. is pleased to announce their appointment as North American and International distributor of Time-Step Electronic's Weather Satellite Receiving System.

This **high quality, low cost system consists of:** --

1691 MHz GaAs FET Pre-amp.	model TS-1691-P. AMP	\$ 175.00
1691 MHz Receiver,	model TS-1691-Recvr	\$ 450.00
Decoder Board & Software	model TS-VGA-SAT3	\$ 300.00

**Also available to complete the system are:** --

Low Loss (microwave) Coaxial Cable (65ft) with connectors.	model 1691-coax ass'y	\$ 45.00
1691MHz Loop-Yagi Antenna,	model 1691-LY(N)	\$ 92.00
1691 MHz Loop-Yagi Extension	model 1691-LY-XTN	\$ 75.00

**Wx-SAT System (all the above items) \$1100.00**

Demonstration Disc (IBM-PC VGA compatible)  
of signals recorded from Wx-SAT system. \$5.00

**Shipping:- FOB Concord, MA**

*Prices subject to change without notice.*

**SPECTRUM INTERNATIONAL, INC.**

Post Office Box 1084-C  
Concord, MA 01742, USA

Phone: (508) 263-2145

**Make the  
most of your  
general  
coverage  
transceiver  
with  
*Monitoring  
Times!***

Every month Monitoring Times brings everything you need to make the most of your general coverage transceiver: the latest information on international broadcasting schedules, frequency listings, international DX reports, propagation charts, and tips on how to hear the rare stations. Monitoring Times also keeps you up to date on government, military, police and fire networks, as well as tips on monitoring everything from air-to-ground and ship-to-shore signals to radioteletype, facsimile and space communications.

**ORDER YOUR SUBSCRIPTION TODAY** before another issue goes by. In the U.S., 1 year, \$18; foreign and Canada, 1 year, \$26. For a sample issue, send \$2 (foreign, send 5 IRCs). For MC/VISA orders (\$15 minimum), call 1-704-837-9200.

**MONITORING TIMES**

*Your authoritative source,  
every month.*

P.O. Box 98  
Brasstown, N.C. 28902

**NEW!**

From  
Micro  
Computer  
Concepts

**VS-100  
ATV REPEATER  
CONTROLLER  
Remote Video Switcher**

- Repeat, Scan, and Manual Modes
- 10 Video and 4 Audio Inputs
- Touch Tone Controlled
- Video ID Input/ELK Board Support
- ATV and Audio Repeat Control
- Features for ATV Use
- Space and Power for Ad-on's
- 19" w x 1.75" h x 10" d Enclosure

VS-100 Wired & Tested w/Manual . . . \$ 399.95  
Manual . . . . . \$ 9.95  
Phone Line Interface . . . . . \$ 99.95



**Micro Computer Concepts**

7869 Rustic Woods Drive • Dayton, OH 45424

**513-233-9675**

# THE STS-37 SAREX FSTV EXPERIMENT

## MARSHALL SPACE FLIGHT CENTER AMATEUR RADIO CLUB SENDS FAST SCAN TV IMAGES FROM EARTH - A HISTORICAL FIRST!

"A small group of ground stations successfully transmitted fast scan television images in April 1991 to an orbiting manned spacecraft for the first time. WA4NZD, The Marshall Space Flight Center Amateur Radio Club, was one of them. A special videotaped coverage report was presented by W3PM Saturday night at the Dayton Hamvention/6th Annual Ramada Inn North USATVS Specialized Communication WORKSHOP Session #2. This followup article is to be published jointly in "The SPEC-COM Journal", "The AMSAT Journal" and "RADIOSCAN Magazine"..."

By

Gene Marcus, W3PM and Ed Stluka W4QAU  
AMSAT Area Coordinators, Huntsville, Alabama

Sunday, April 7, 1991, 1442 UTC

"I got it!...Good picture Marshall...P4!", exclaimed STS-37 Pilot Ken Cameron, KB5AWP, aboard the Shuttle Atlantis. This message, transmitted from space on 2 meter FM, brought cheers of joy and excitement from the 11 club members and visitors gathered at the club station in Huntsville, Alabama.

### Technical Challenges

As any ATV'er can attest, it takes far more power and antenna gain to transmit an acceptable FSTV picture the same distance on 70cm as it does to transmit a FM voice signal on two meters. Because of the wider FSTV bandwidth (6 MHz) and the additional path loss at 70cm, a FSTV uplink station must be approximately 36 dB or 4000 times stronger than a packet or FM voice station on 2 meters. Obviously, most typical OSCAR or ATV stations do not fall into this category.

Additional challenges face the ground station attempting to send FSTV to a manned spacecraft. Although most ATV'ers transmit on many popular ATV frequencies found throughout the 70cm band, a station attempting to transmit to a spacecraft is required to use the 435 - 438 MHz Amateur-Satellite Service subband. A 6 MHz wide FSTV signal cannot fit within this subband, therefore, a special FCC waiver is required to participate in this experiment.

From the Shuttle's lofty vantage point, many unwanted terrestrial signals can be heard within the 6 MHz wide uplink frequency allocation. Terrestrial interference from OSCAR satellite users, FM repeater users, and other transmitters will degrade the link. Any ATV repeater group with a repeater input on 439.25 MHz has undoubtedly experienced some form of in-band interference. Just imagine all the in-band signals a 6 MHz wide 70cm FSTV receiver will hear from an altitude of 450 km in space!

The 70cm antenna aboard the Shuttle consists of an annular slot mounted in the same window mounted enclosure as the 2 meter antenna used for other SAREX activity. Filter circuits are included to provide isolation between the two antennas. The orbiter's attitude varies throughout the mission, therefore, the slot antenna provides unknown polarization changes and nulls in its pattern. A circularly polarized uplink antenna is the antenna of choice. However, a 3dB penalty will have to be paid due to linear-to-circular cross polarization. The rest of the SAREX FSTV equipment consists of a FSTV receive module, a small 4 inch LCD video monitor, and a recorder that uses standard VHS cassettes. Most of the hardware was provided by the Amateur Radio Club at Motorola in Schaumburg, IL.

### Preparations

The Marshall Space Flight Center Amateur Radio Club (MARC) is fortunate to have members that are both active amateur satellite users and ATV enthusiasts. When the unique opportunity to participate in this experiment became a reality, MARC club members did not have to think twice about accepting the challenge.

Two basic committees were immediately formed; MARC President, Larry Savage, WA4CAX, volunteered to head the transmitter committee, and Gene Marcus, W3PM, volunteered to lead the antenna group. Terry Jones, NZ8C, acted as project coordinator to interface with the SAREX office at the Johnson Space Flight Center and to ensure all of our milestones were met.



FSTV link budgets were prepared for various slant ranges from the Shuttle to Huntsville, Al. The link budgets indicated ground EIRPs that ranged from a minimum of 41.7 dBw (14,791 watts) to a maximum of 49.7 dBw (93,325 watts). A typical slant range of 1500 km yielded a ground EIRP of 45.6 dBw (36,307 watts). All calculations assumed a carrier to noise ratio of 30 dB, STS-37 receiver noise figure of 3 dB (including cable and connector losses), STS-37 antenna gain of 0 dBi, and an antenna linear to circular cross polarization loss of 3 dB. We decided to try to obtain the typical figure of approximately 36 KW EIRP.

Using an ubiquitous ATV brick amplifier of approximately 70 watts peak output would necessitate building an antenna array with over 27 dBi gain. An antenna array with this much gain on 70cm would be large and bulky. Because antenna beamwidth is inversely proportional to antenna gain, the narrow beamwidth would require exotic azimuth/elevation rotators and controllers to adequately track a spacecraft in low earth orbit. Clearly, the answer to our problem was to use higher power and lower gain (larger beamwidth) antennas.

The solution to our dilemma came in the form of a telephone call from Andy Bachler, N9AB, from Motorola in Schaumburg, IL. Andy asked if we would like to use a solid state Motorola driver/final amplifier (with power supplies) that would easily output 300 watts on 70cm. Would we ever! Without hesitation, we accepted. Ed Stluka, W4QAU, made a side trip to pick the unit up from Andy during a vacation to Illinois. The only thing remaining was to convert the unit to FSTV operation. Larry, WA4CAX, converted both driver and final amplifiers within a week. A small VHF Engineering amplifier was put into service to boost the one watt FSTV transmitter to the five watts necessary to drive the driver amplifier. Our transmitting setup was now complete.

With 300 watts of FSTV peak power available, we now needed an antenna of approximately 20 - 21 dBi gain. A little research indicated that an array of four 20 turn helix antennas would provide all the important criteria for this project; adequate gain, circular polarization, and broad bandwidth. Because this was a one-time experiment, the antennas were constructed of wood, hardware cloth, and surplus coax for the helix. The total cost of the antennas turned out to be \$44.25 including tax! An added bonus soon became apparent when our computer tracking program indicated that STS-37 would only reach a maximum elevation of 29 degrees here in Northern Alabama. Our antenna beamwidth of approximately 20 degrees meant that we could fix the antenna elevation at 11 degrees and eliminate the elevation rotator and controls.

During the short time the orbiter would be above 21 degrees, it would also be at its closest slant range (lower required EIRP). Computer projections confirmed that STS-37 would be available between elevations of 4 and 20 degrees for most communication windows with Huntsville.

#### Last Minute Equipment Problems

There was a sigh of relief mixed with a feeling of anticipation when Atlantis blasted into space at 1423 UTC, Friday, April 5. A few hours after liftoff we received our FSTV transmit schedule confirmation from the SAREX office, W5RRR, at Houston. All of our equipment was ready, and early the following morning during orbit 16 it would be put to the test.

What true ham could resist performing that last minute test? We knew we couldn't, and proceeded to aim the antennas at the Tennessee Valley Amateur TV repeater located in Huntsville for that last minute signal check. It is very difficult to describe the sinking feeling we all had when Ernie Blair WA4BPS and his wife Carol N4QPE suddenly announced our signal was barely readable just about the time our output power meter indicator moved rapidly to the left. We lost the all-important final amplifier!

Ernie and Dick Curtis, KK4HF, suggested we contact Warren Locklin, N4RUC, in Mobile, AL. Ernie recalled Warren mentioning a high power ATV amplifier on the 75 meter ATV net. Warren was extremely helpful, but the amplifier he knew of was located in Baton Rouge, LA. Time was running out. We resigned ourselves to the fact that we would have to attempt the test using 70 watts. After all, our signal would only be down about 6 dB.

When we arrived at the club station early the following morning, everyone was quite surprised to find Larry, WA4CAX, busily working on the final amplifier. Larry discovered that the power modules used in the driver amplifier were directly interchangeable with the modules used in the final amplifier. The final amplifier just used more of them! We were fortunate to discover only four defective modules; exactly the number of good modules in the driver amplifier! A Mirage D100 amplifier belonging to Tim Cunningham, N8DEU, was quickly pressed into service as the new driver amplifier.

Although the amplifier repairs could have been rushed to meet the orbit 16 schedule, we chose an alternate orbit offered by the SAREX office. We would have to wait until the following morning for an attempt during orbit 32. Needless to say, additional last minute testing was not performed this day!

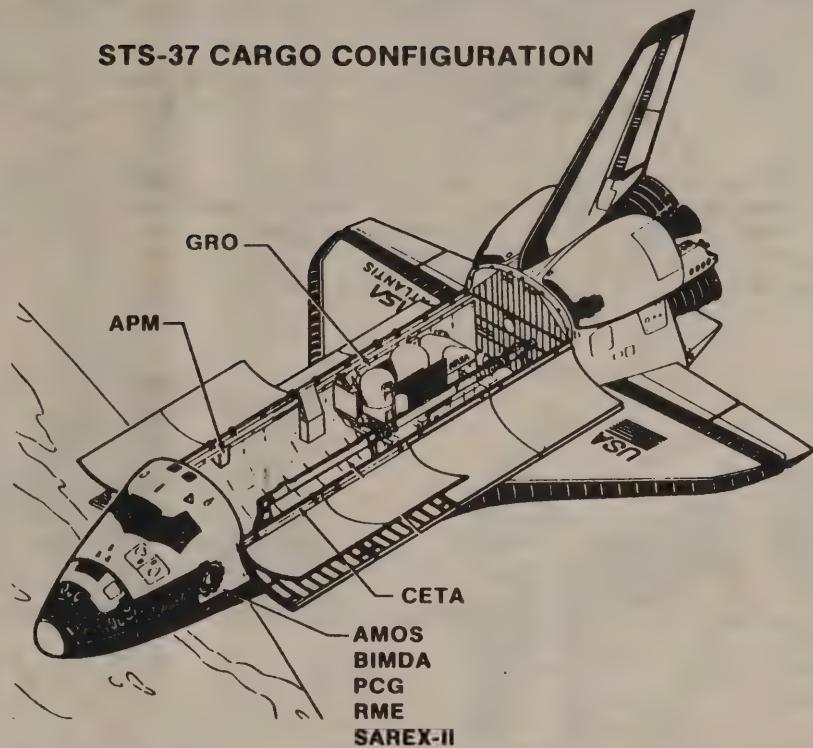
#### Orbit 36

Upon arriving at the club station Sunday morning April 7, we learned that Atlantis did not successfully receive FSTV from any of the participating ground stations during the Saturday tests. Did we actually have a chance at becoming the first to succeed? By 1432 UTC all the participating club members and visitors were at their positions. Don Hediger, N4MSN, was on a telephone bridge with the other participants and the SAREX office at JSC; Randy Galloway, KN4QS, manned the direct 2 meter FM link to the Shuttle; Dick, KK4HF, operated the video equipment; Larry, WA4CAX, monitored the transmitter; and Gene, W3PM, controlled the antennas.

Don learned through the telephone bridge that video from KC6A in California was successfully received by Atlantis. Moments later we heard Ken, KBSAWP, aboard Atlantis describing the video on the 2 meter voice link.

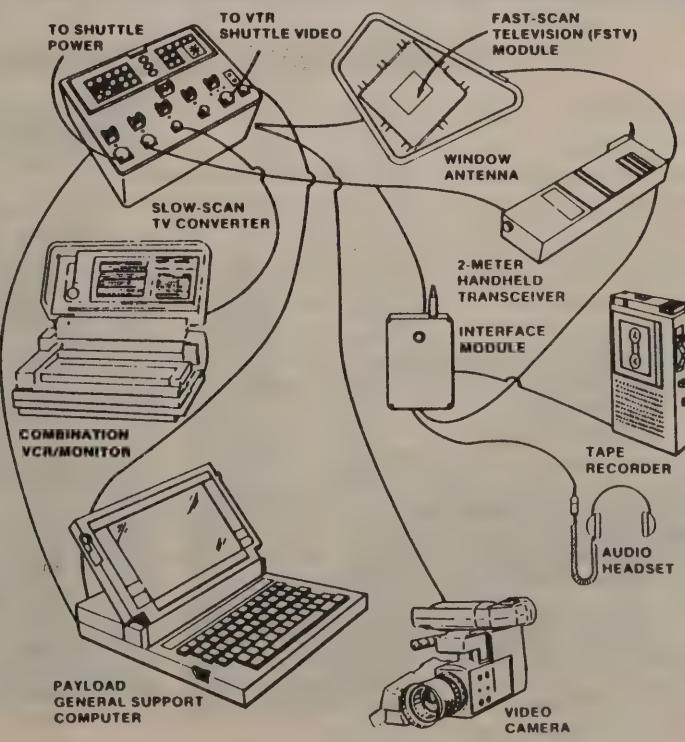
Don called out, "45 seconds to go", as everyone's nerves tensed a bit. About the time we received the signal to turn on the FSTV transmitter, Randy was in direct contact with Atlantis on 2 meters. Moments later KBSAWP's voice resounded through the room, "I got it!...Good picture Marshall...P4!". Hearing those words, Dick immediately switched from the station ID to live video. "I see two operators", Ken radioed to earth upon seeing the happy smiling faces of WA4CAX and W4QAU. "Now three" we heard as N4MSN stepped in front of the camera. "Make that four!" Ken exclaimed as KN4QS got into the picture. Ken asked if we have video of the launch, but unfortunately we could not comply. As KK4HF panned the camera around to the various operating positions at WA4NZD, Ken explained that his 2 meter

#### STS-37 CARGO CONFIGURATION



For all the latest in NASA Space Shuttle Flight information involving Amateur Radio Astronauts, check into the Electronic Cottage BBS (319) 582-3235 [300-2400 baud 8-N-1].

#### SAREX-II OPERATIONAL CONFIGURATION "D"





Gene Marcus, W3PM with his homemade 70 cm antenna, used in the STS-37 contact.

From left to right: Terry Jones, NZ8C; Gene Marcus, W3PM; Don Hettiger, N4MSN; Larry Savage, WA4CAX and Ed Stluka, W4QAU.



The Marshall Amateur Radio Club.



transmissions were interfering with the FSTV uplink. Therefore, he would try to make his transmissions very short. As Dick tried to get everyone in the room on camera, we would periodically hear Ken's voice from space exclaim, "This is super!". Before we realized it, our time was up and we had to wave good-bye to Ken and the rest of the crew aboard Atlantis. What only seemed like only a few seconds, was actually a three minute slice of time that will remain with us for the rest of our lives.

### SPECIAL NOTATIONS CONCERNING STS-37 FLIGHT by Mike Stone WB0QCD

SPEC-COM Communications & Publishing Group Ltd. and the larger USATVS national ATV organization has been working for about 2 years with Bill Anderson, SYSOP of the NASA "SPACELINK" computer BBS at Marshall Space Flight Center in Huntsville, AL. (205) 544-0994. The USATVS has been gathering NASA SELECT VIDEO and AUDIO database information concerning HAM RADIO relay repeater systems. The USATVS has been passing this information on to authorities within the NASA program as well as The ARRL. The USATVS is looking for additional 2 Meter and above FM and UHF FSTV Repeater systems within North America that are set up to carry NASA SELECT Video and/or Audio relay information. Register your system by writing to The USATVS P.O. Box 1002, Dubuque, Iowa 52004-1002; or by calling (319) 557-8791 and leaving a message or by connecting with The Electronic Cottage Computer BBS in Dubuque, Iowa [300-2400 baud at 8-N-1] at (319) 582-3235. Leave a message for either Mike Donovan or Mike Stone ([M]ail) and be sure to browse around through the special [H]am Radio Section Menus which includes all mode coverage including Satellites.

Members of the Marshall Space Flight Center ARC were invited to participate in the Saturday night, April 27th, 1991 USATVS Specialized Communication WORKSHOP Session #2. A record large turnout resulted. 16 of 18 planned speakers addressed the 6th annual Ramada Conference on Friday and Saturday evenings during Dayton Hamvention weekend said to be some of the best technical seminars available. Videotapes may be available of the Marshall Atlantis FSTV contact "special event". Contact the Marshall Space Flight Center Amateur Radio Club at (205) 544-7703.

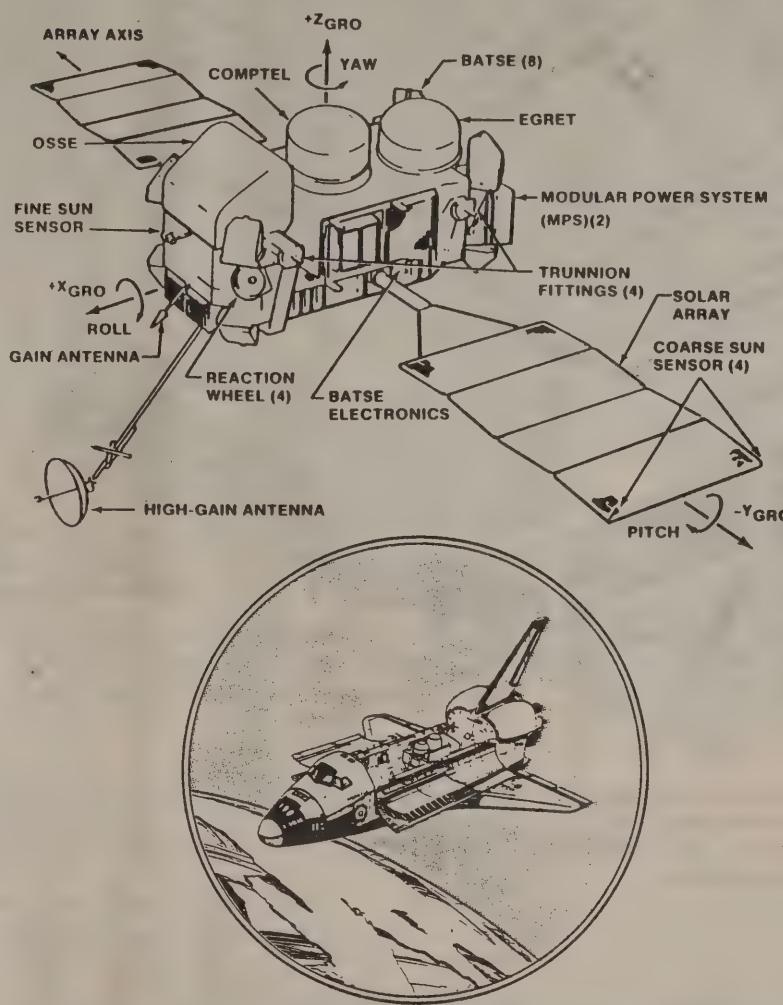
Three other FCC STA "authorized" Amateur Radio Ground Stations also transmitted successful FSTV picture image emissions to the Shuttle Atlantis. They were: KC6A in California (W6VIO backup), Andy Bachlor N9AB of the Motorola ARC in Schaumburg, IL and W5RRR Johnson Space Center Amateur Radio Club in Houston, Texas. Other FCC authorized, but unable to work the Shuttle stations were; W6VIO Jet Propulsion Lab in Paedena, CA, WA3NAN at Goddard Space Flight Center in Silver Springs, MD, W1AW ARRL in Newington, CT, KE4PT Motorola in Coral Springs, FL and AK8Y Lewis Research Center in Cleveland, OH.

There has been considerable discussion within the ATV community led by Don Miller W9NTP of Wyman Research in Waldron, IN, Steve Franklin WBSKGL of T.D. Systems in Pantego, TX and Mike Lamb N7ML at AEA in Lynnwood, WA for using FM-TV for future Amateur TV to NASA vehicle uplinks at improved quality, far less power and antenna ERP needed. FM-TV operation is gaining momentum and stirring a lot of interest.

The Astronauts who manned the April STS-37 flight that were HAMS were; Ken (is your) Cameron KBSAWP, Steve Nagle N5RAW, Linda Godwin N5RAX, Jay Apt N5QWL and Jerry Ross N5CSW. Some SSTV and Packet signals were sent and received.

"Special Congratulations" to the Atlantic STS-37 Ham Flight Crew and to the members of the Marshall Space Flight Center Amateur Radio Club for "making TV contact!" Another "first" for Amateur Radio... -WB0QCD

### GAMMA RAY OBSERVATORY CONFIGURATION



### STATEMENT OF CORRECTION

The SPEC-COM Journal reported on page 39 of our Mar/Apr. 1991 issue that TX RX Systems Inc. of Angola, New York has issued a major RECALL of certain models of their \$1000.00 TV video Duplexers. Our comments continued; "A major design flaw was discovered and units arriving back at the factory are being checked, fixed or if unfixable, are being replaced with new units." We gave the company's phone number a call to check on this situation directly. Our source of information came from public on-air comments made by a amateur radio club in late February 1991. TX RX Systems Inc. has advised us that some of the Model 26-66-01A ATV Duplexers did indeed have resonator mis-alignments of a tuning rod that could cause "arcing" and that they have been repairing or replacing these problem units as soon as it has been brought to their attention. TX RX Systems Inc. DOES NOT HOWEVER HAVE A MAJOR RECALL ISSUED AS REPORTED. SPEC-COM regrets the error.

**WATCH OUR NEXT ISSUE FOR A SPECIAL EXCHANGE AGREEMENT WITH THE GERMAN A.G.A.F. "TV AMATEUR" PUBLICATION!**



## rfc 2/70G DUAL-BAND AMP NOW AVAILABLE!

RF Concepts - a division of Kantronics - PO Box 11039 in Reno, Nevada 89510 (Phone: 702 827-0133) has now made it possible to run both 2 meters and 430-450 MHz (independently) on the same amplifier! Imagine, talking to someone on 144.340 MHz or your favorite 2 meter ATV "talk" channel in your area and then to say: "Standby Charlie, let me send you an amplified Fast Scan TV picture from my Camcorder of what I am seeing here in my travels!"

This amp is the first amplifier designed to amplify both bands automatically. Designed for low-power HT type inputs, this model is ideal for up to 5-watts of input signal on either 2 meters or ATV. It accepts and drives inputs from several of the popular FSTV transmitter or transceivers manufactured in this country. 5W in gives 30 watts out on 2 meters, 20 watts out on FSTV. PIN diode protected twin GaAsFet preamplifiers "boost" signals on receive. Check this hot new item out today!

## RF CONCEPTS RFC 4-110 UHF AMPLIFIER REVIEW Relatively Unknown Amplifier Shows Some Surprisingly Rugged Reliability!

Review by Steve Whiting N8LWX  
Dimondale, Michigan

Everyone around me had some sort of high-power amplifier and I knew I had to get with the picture to stay competitive and also contribute good quality FSTV pictures in this part of Michigan. ATV is really growing around here and so, I decided to study all available amps on the market and choose one which looked like it could handle wideband TV transmissions and not break my budgeted pocketbook.

I really debated between a couple of the MIRAGE models (especially the D1010N) but thought I would give a try to the "NEW KID ON THE BLOCK", KANTRONICS new RF CONCEPTS model RFC 4-110 440 MHZ Power Amplifier. I purchased it from Don Miller at WYMAN RESEARCH for \$325.00. The RFC 4-110 is a "state of the art" GaAs-Fet preamp, variable SSB delay, "High SWR" and over temperature protected, automatic or remote keying UHF amplifier that is designed to work in all modes including FM, CW, SSB and (with special modifications installed at the factory) ATV.

Frequency Range is from 430-450 MHz. Power input is 200 mw to 15 watts output, 10 watts to 100 watts output. Maximum input is 15 watts. Noise figure on the onboard preamp is 2 to 3db. Gain: 12db. Temperature protection: 175 degrees F. Input-Output impedance: 50 Ohms. Voltage requirement 13.8 VDC at 22 amps. The unit weighs only 5 lbs and is 11.5 X 6 X 3 inches.

Anyone who has been in ATV for any period of time probably is aware that MIRAGE went through many years of fine tuning to get models that worked well on

ATV. The same thing has happened to RF CONCEPTS. Early models were said to have problems handling a TV signal but later modified versions did not. It is well known that some of the key people left MIRAGE to go to work for RF CONCEPTS and thus, some of this modification knowledge for FSTV no doubt traveled with them.

The amplifier works beautiful. I can send colorbars or any other video signal through it and it performs rock steady. I recommend keeping a small muffin or blower fan running on it while in use. Rig it to the 12VDC to come on when the unit is excited. I have had mine running for near an hour on several occasions with no apparent melt-downs. A few times, when I did forget to turn the fan on, the automatic temperature feature took over and shut me down in self-protection. It allows the amplifier to "come back on" when a certain cooler level of operation is achieved.

The onboard preamp (not available at that time on MIRAGE 100 watt UHF models) helps get back some of my line loss and makes up for loss in the switching system within the amplifier. Several local ATVers have been in my shack and witnessed 1 P-unit level difference when the amp is switched in and out of line. There has been significant differences noticed on weak stations. I don't have a 432 MHz SSB rig as yet (I am working on getting one) so I have not checked out this amplifier on SSB. I am sure it works fine.

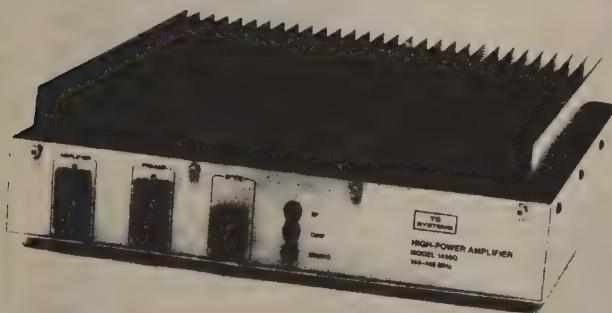
One unique aspect that RF CONCEPTS has over the more popular MIRAGE model D1010N is the dual input range handling tolerances. You can run an ATV exciter board at up to 200 mw and get 15 watts out and run a standard 10-watt rig at full power output. There is no need to go into the amplifier and cut out resistors and a jumper in making needed modifications to run a lower power unit.

Use heavy guage wire to connect up to a 12VDC power source. For medium distances use #10 wire. For long distances use #8 wire. VSWR should be less than 1.5:1. A 5-pin DIN plug is used for remote controlling if needed. Proper Type 'N' coax connectors are installed by the factory.

Kantronics warrants the unit free from defects in material and workmanship for 5 years from the date of purchase with the exception of power transistors which are warranted for 6 months.

I know a lot of Fast Scanners operate the compared to MIRAGE D1010N unit. I am sure it too is a great amplifier. I just would like to let everyone else know out there in USATVS land that there is now an alternative to compare to. I am quite happy with my RF CONCEPTS amplifier. I just recently purchased a hefty dual 4CX250F tube type amp built by K9KKL from WB0QCD (he got T.E. Systems new 175-watt transistorized unit model 4450G) at Dayton that looks like it is rated at near 1/2 a kilowatt. If that amp works out okay, that would be the only reason I would probably part with the RFC 4-110. I recommend Kantronics new product highly to anyone getting on ATV or deciding to get with the big-boys for more respectable power. Watch for my midwest DX now fellas... -N8LWX

## T.E. SYSTEMS 4450G FIRST TESTS



by Mike Stone WB0QCD

As promised in our last issue, I wanted to report to the membership, the first performance test results of T.E. Systems new BIG P-O-W-E-R-F-U-L model 4450G 420-450 MHz transistorized amplifier. Models are now available. Specify when ordering the selected 10 MHz. portion of the band that you are most likely to frequently operate (preferred tuning by the factory). I ordered mine to be tuned at peak performance around 434 MHz where I operate DX-ATV and (432 MHz) SSB.

First off, the amplifier took a long time to get. We spent over a year bugging Chief Engineer Dave Anderson to get us a paid for model. Apparently, they are always busy with military orders or so the excuse. I have heard of others who also waited a long time to get their products from T.E. Systems - but eventually they got them and have reported

good luck with the merchandise. I always tried to give them the benefit of the doubt, especially since the new 4450G model amp is a major breakthrough past the 100-watt class category of all other power boosters. Their 2 meter amplifiers/preamps do seem to ship faster than their UHF specialty models.

I received the amplifier in February 1991 and immediately put the unit to test. While waiting for the T.E. amp to arrive, I ordered a 60 amp ASTRON 19" rack-mounted power supply to handle the beast. ASTRON's 60 amp model was admittedly a bit of overkill just to run T.E.'s amp (34 amps maximum rated) but I also wanted to power some other goodies in the shack and supply extra electricity for the rest of the farmhouse (HI HI). ASTRON's RM or RS-35 should handle the 4450G unit (with nothing else loading it down under transmit) but I would recommend one grade better if you can afford it (a 50 amp power supply).

The T.E. Systems 4450G is a BIG puppy as transistor amplifiers go. It is about twice the size (width wise) as a MIRAGE D1010 (10 inches square) and it's as heavy as a brick. Anyone who takes that first glance at this beauty is immediately impressed by factory engineering, layout and construction. The quality and professional styling of the unit just jumps right out at ya'. "Well, something can look



**TE SYSTEMS**  
P.O. Box 25845  
Los Angeles, CA 90025  
(213) 478-0591

beautiful, but if it smokes under fire, it ain't worth a hoot!" Rigs fired into the 4450G for initial testing include an ICOM 10-watt rated IC-490 (mobile) rig (430-440 MHz) CW, FM and SSB, a 10-year old, homebrew, P.C. Electronics TC-1 ATV transceiver (kit) with an ailing brick running about 6-watts of remaining carrier power and a 1-watt PCE Kreepie Peepie KPA5 exciter transmitter module on loan from KA0JAW ATV/R in Dubuque. The facts tell the story:

FREQ	MODE	IN	OUT	AMPS
430.000	FM	5.0	130	30.5
431.000	FM	5.75	135	31.5
432.100	SSB	6.2	120	31.0
433.000	FM	6.75	125	33.0
434.000	FM	6.0	160	35.5
434.000	ATV	6.0	85.0*	29.0
434.000	ATV	.8	68.0*	25.75
435.000	SSB	8.0	150	32.0
436.000	FM	7.0	110	30.0
437.000	FM	8.0	115	31.0
438.000	FM	8.0	85	29.0
439.250	FM	8.0	80	29.0
439.250	ATV	6.0	52*	26.5

\* BIRD 43 average reading of video power

**Note:** The variable power inputs from the FM exciter is due to ICOM output characteristics and VSWR loading and matching over a 10 MHz spread on the antenna line up and down the band. I have my lowest VSWR at 434.0 MHz using 4-48 element JAYBEAMS.

**RESULTS:** As you can see by the chart of tested readings, my unit centered out around 434 MHz for peak output. I am confident that 10 watts of FM would have brought all the power levels up and the 434 MHz reading to a full (if

**CONTINUED ON PAGE 69...**

# ANTENNACRAFT G1483/SUPER G1483 UHF-TV COLINEAR REFLECTORS

## It's True! Sometimes Smaller Is Better...

FIRST COMMERCIAL UHF-TV ANTENNA DEVELOPED THAT ALSO HAS GOOD GAIN AT 439 MHZ.

IDEAL RECEIVE ARRAY FOR ATV/R APPLICATIONS!

One of the most economical ways to get someone on FSTV during the early stages is to get them to use a standard commercial UHF-TV antenna. Most commercial UHF-TV antennas however, fizzle out in the gain department below Channel 14 and have hardly any gain at all in the 420-440 MHz portion of the Amateur TV band on 70 cm. Wineguard's popular 4 and 8-bay bowtie (with screen mesh background) arrays are good examples of fine commercial TV channel broadband coverage from channel 14 to 83 but if measured at 439.250 MHz. - little gain if any exists unless elements are lengthened significantly. UHF designed beam antennas offer good gain at the frequency where they are designed for but little and even negative gain on other TV frequencies. It is for this reason, that trying to use the standard rooftop UHF portion of your TV antenna usually meets with less than satisfactory reception and can actually discourage newcomers who are desperately just trying to "see something" of Amateur TV without making an actual heavy financial commitments.

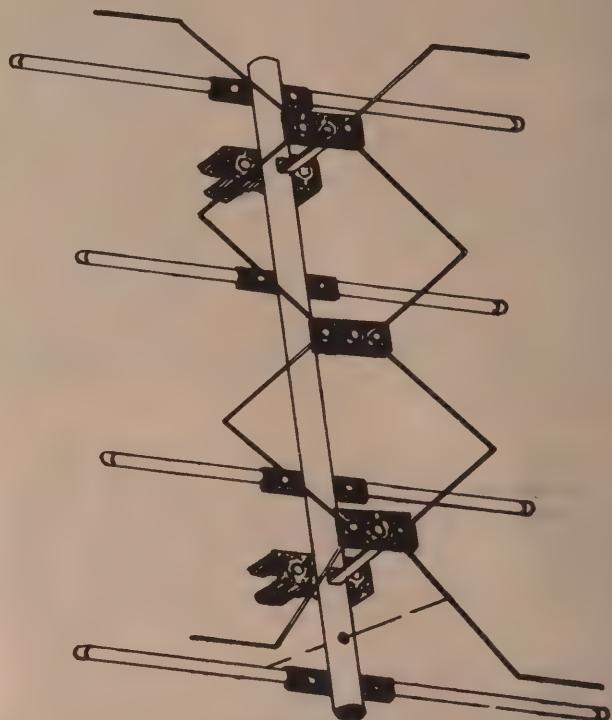
Here is a possible answer to using the standard UHF-TV antenna dilemma. ANTENNACRAFT (P.O. Box 1005) of Burlington, Iowa (52601) is now manufacturing a new line of high gain, commercial UHF-TV antennas called the G1483 series. They are making some models to slightly different specs. (lesser grade) for RADIO SHACK STORES nationwide. Here in the midwest, FARM KING STORES carry the G1483 series of UHF-TV antennas direct from the factory. JERR-ROLD ELECTRONICS CORP. of 200 Witmer Road in Horsham, PA 19044 and CHANNEL MASTER in Ellenville, NY 12428 are also distributors of ANTENNA CRAFT components.

There are two similar yet very different G1483 array models: a 4-bay array model called the G1483 and a much larger 8-bay array called the SUPER G1483. The smaller 4-bay array (graphic pictured) is very similar to the French ZIG-ZAG array covered in an earlier SPEC-COM article under the Harry Tootle LPTV column and to some published German designs of many years ago. G1483's utilize 300 or 75 (balun required) ohm bent, phase driven, open ended, wire elements in a diamond shaped pattern (Patent 2918672) producing horizontal polarization patterns with a wide, fat frontal radiation lobe. 4 all-aluminum gold finish reflector tubular elements fold and snap up in place attached to a square stock boom mast pipe. Clamps are provided for easy U-bolt mast pipe attachment. The SUPER G1483 array is the same basic designed antenna only with twice as much material utilizing 8 bays and reflectors. They are both very lightweight.

Paul Nees KOIWA, noted FSTV DX record holder who lives in Burlington, Iowa first brought these new antennas to the attention of local ATVers. He actually had an 8-bay array in operation on 421.250 MHz recently at the Rock Island, IL HAMFEST in late February. He was receiving ATV pictures from the Quad-City ATV Club remote transmitter sight across the river in Davenport, Iowa - a distance of about 5 miles through some low-level terrain and inside a brick warehouse building. He received good color pictures.

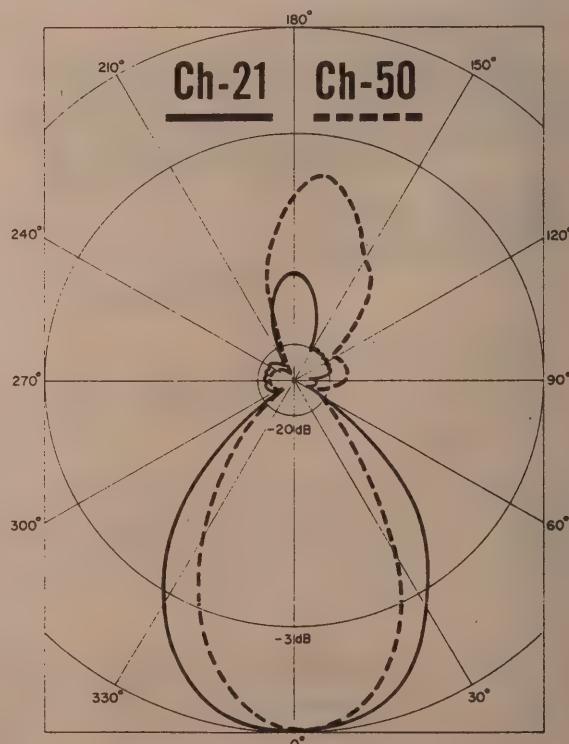
I purchased one 8-bay array from Paul (he brought up four to sell and they all sold out quickly!) and took it home to do some actual on the air testing. After making some phone calls to the FARM KING STORE and the manufacturing ANTENNACRAFT Company (George Smyth K0KOP and others), I learned that a smaller 4-bay array might actually be better suited for HAM-TV use in the 70 cm band than the larger 8-bay array. How could this be? The bigger and more elements the antenna the better gain, right? Wrong. According to factory design engineers, not for out of band signals.

The two similar arrays have different GAIN characteristics dependent upon what part of the UHF-TV band you are trying to watch. For example, if you want the best array for watching standard commercial UHF-TV channels from 14-54 - the 8-bay SUPER G1483 is the antenna to purchase. Overall GAIN is said to have been tested and measured at 13.4 dB (Channels 14-54) [an excellent UHF-TV non-beam DX antenna] but the 8-bay model is suppose to show only 3.7 dB at 439 Mhz. Comparitively, the 1/2 size, smaller, 4-bay model G1483 was stated by the factory to measure a reduced commercial TV reception figure of 11.6 dB (Channels 14-54) but an increased 10.6 dB at 439 MHz for HAM-TV!



This sounded quite odd and too good to be true and so we ordered out the smaller version array also from the Burlington FARM KING STORE (UPS 2 lb. boxed delivery) to check these two arrays out and "see" for ourselves.

The 2nd 4-bay array arrived a few days later and with both antennas, we grabbed a TV set that covered both the commercial TV and HAM-TV UHF bands and set out for a hilltop location to test out the unusual claimed gain figures. Sure enough, as stated, the smaller 4-bay



G1483 array won out dramatically over the larger 8-bay array in visual tests with ATV signals transmitted on 439.250 MHz. about 10 miles away. It was unbelievable that "smaller was indeed better" in this particular case. Monitoring several commercial UHF TV signals however (Channels 18, 24, 28, 32 and 40) proved the larger SUPER G1483 model to be the superior receive antenna just as the factory had claimed. Both models will receive HAM-TV signals but the smaller array was dramatically better in performance in out of the band signal reception (420-440 MHz ATV).

**PRICES:** The ANTENNACRAFT 4-bay G1483 antenna sells for \$11.95 at FARM KING and the larger 8-bay SUPER G1483 for \$16.39. Add \$3.00 per antenna for boxing and U.P.S. delivery anywhere in the USA. Store Manager Norman Thompson at the 609 Gear Ave, West Burlington, Iowa 52655 FARM KING Store (Phone: (319) 752-7111) says he would be glad to order in and ship these antennas to SPEC-COM/USATVS Members. Mention this article when ordering. Ask for Norm or the TV Department.

The less expensive 4-bay G1483 array works well on both commercial TV and Ham-TV signals and is ideal low-cost antenna for newcomers to get on ATV if they live with 10-15 miles of existing ATV signals. If things for some reason didn't work out, the gambler ends up with a nice, inexpensive, commercial UHF-TV antenna. I replaced my rooftop UHF-TV antenna with an ANTENNACRAFT model for more flexibility. This double-duty antenna would also be great for T-Hunts, portable or Field Day applications, Balloon watching, TV DX'ing, etc.

**SUGGESTION:** Get a good (weatherproof) outdoor 4-way splitter, stack four of the 10.6 dB gain G1483's - one North, South, East and West for H-plane near OMNI ATV simplex receive or repeater applications (for less than \$50.00!). Preamp them all with a good Amateur TV band inline preamp it, use good, low-loss, cable line and the arrays will work for you even harder! Thanks K0IWA for the inspiration... -WB0QCD

**RECEIVE "FREE" PUBLICITY ABOUT YOUR BALLOON LAUNCH OR SPECIAL EVENT!**  
**SEND INFORMATION TO: SPEC-COM**  
**Attention: Dale Lam WA0NKE**

**COMING ATTRACTIONS!**

**DAVE PALAEZ AH2AR/8 MATINEE**

Dave has sent us enough technical material to last for remaining 1991 issues! Watch for it all beginning with the very next issue. Thanks Dave!!!

**DAYTON ARA BUILDS DOWNCONVERTERS**

**HOW NOT TO SET UP AN ATV STATION**

**BEAT "THOR" TO THE PUNCH...**  
 (Lightning Protection)

**USING BRICKS FOR INCREASED POWER**

**EASY SOLUTION FOR T-R RELAY PROBS**  
 also coming:  
**OBSERVATIONS/MODS ON PCE TVC-2Ga**  
 by Bob Spahn WDSBJW

**80 PAGES NEXT ISSUE!**

# VHF COMMUNICATIONS

## SPEC-COM JOURNAL/USATVS MEMBERSHIP "SPECIAL CLOSEOUTS"

(Not Advertised In Any Other Ham Radio Magazine)  
 SEE ADS ON MONDAY NIGHT "QSO Amateur Radio" PROGRAM - SPACENET 1 CH-15

**WE NOW STOCK RETAIL DEALER COPIES OF SPEC-COM!**  
 Watch this space for future closeout specials!

### JAYBEAM Products from England

XD/2M	Crossed Dipole VHF 2 Meter Antenna .....	\$35.00
5XY/2M	5 element (each plane) 2 Meter 7.8 dBd 1 KW Crossed Yagi ....	\$60.00
8XY/2M	Higher-gain 8 element array .....	\$70.00
10Y/2M	10 element 2 Meter Beam 11.0 dBd 1 KW Horizontal Antenna ..	\$40.00
PMH2-2M	2 Meter 2-way phasing harness .....	\$12.00
PMH2-2M	2 Meter 4-way phasing harness .....	\$12.00
PMH2-70	70 cm 2-way phasing harness .....	\$20.00
PMH4-70	70 cm 4-way phasing harness .....	\$20.00

We also have special closeout prices on all HEATHKIT items!  
 Call for list.

### AEA Closeout Specials

Commodore computer PK-64, H & A model VHF & HF All-Mode Controllers ... From \$165.00!  
 6 Meter, 10 Meter SSB DX Handie Talkies (just a few left!) ..... \$249.95

### OTHER GOODIES!

ICOM EQUIPMENT: 2AT's (2 Meter) \$249.00! 24AT-Dual Band HT's 2/440 \$399.00!  
 DRSI PACKET Controller: IBM format, Type I or Type 3 \$129.00. Type II \$149.00.  
 IBM Computers: XT w/512K memory, dual 5.25 360K floppies, Amber Monitor \$399.00!  
 NAVAL Docking Boosters: 30 watt battery pack replacement 25% off. HT Audio \$19.95

9:00 am - 5:30 pm weekdays

(800) 752-8813 for orders only

PH. (716) 664-6345

Western New York's finest ... amateur radio dealer!

"ASK FOR GARY ANDERSON"

**VHF COMMUNICATIONS**

280 TIFFANY AVENUE  
 JAMESTOWN, NEW YORK 14701



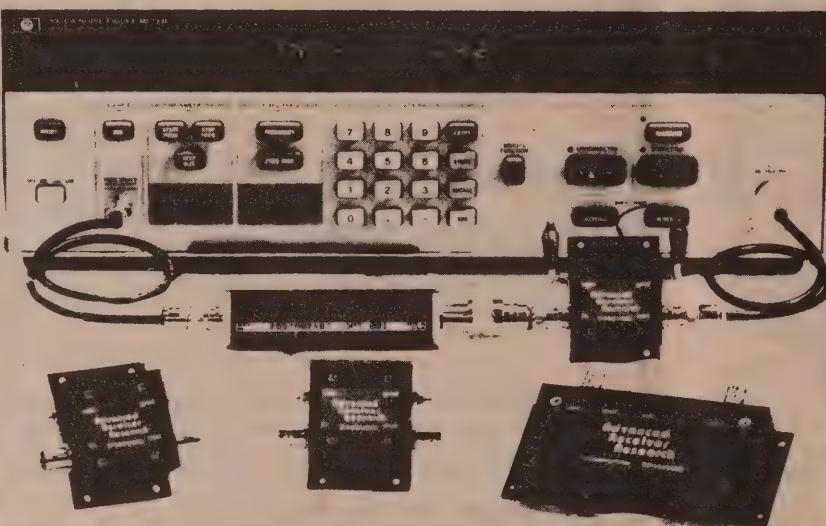
## WANT TO HOST YOUR OWN SATELLITE AUDIO "TALK" SHOW?

JOIN Jim Bass (Open Forum), Gordon West WB6GOA (Beginning Ham Radio), Bill Brown WB8ELK (ATV), Greg Mengell KA6DPV (WEFAX), Bob Grove WA4PYQ (Shortwave & Monitoring), Connie Dunn KB5LES (YL Talk), Joe Holman KA7LDN (AMSAT/OSCAR) and others Monday-Friday nights 9-12 pm (Eastern) on "QSO Amateur Radio", Spacenet 1, Channel 15! Contact Program/Advertising Sales Director: Mike Stone WB0QCD at Closed-Circuit Video Productions (319) 452-3628.



High Performance

## vhf/unf preamps



Receive Only	Freq. Range (MHz)	N.F. (dB)	Gain (dB)	1 dB Comp. (dBm)	Device Type	Price
P28VD	28-30	<1.1	-15	0	DGFET	\$29.95
P50VD	50-54	<1.3	15	0	DGFET	\$29.95
P50VDG	50-54	<0.5	24	+12	GaAsFET	\$79.95
P144VD	144-148	<1.5	15	0	DGFET	\$29.95
P144VDA	144-148	<1.0	15	0	DGFET	\$37.95
P144VDG	144-148	<0.5	24	+12	GaAsFET	\$79.95
P220VD	220-225	<1.8	15	0	DGFET	\$29.95
P220VDA	220-225	<1.2	15	0	DGFET	\$37.95
P220VDG	220-225	<0.5	20	+12	GaAsFET	\$79.95
P432VDA	420-450	<1.8	15	-20	Bipolar	\$32.95
P432VDA	420-450	<1.1	17	-20	Bipolar	\$49.95
P432VDG	420-450	<0.5	16	+12	GaAsFET	\$79.95

### Inline (rf switched)

	Freq. Range (MHz)	N.F. (dB)	Gain (dB)	1 dB Comp. (dBm)	Device Type	Price
SP28VD	28-30	<1.2	15	0	DGFET	\$59.95
SP50VD	50-54	<1.4	15	0	DGFET	\$59.95
SP50VDG	50-54	<0.55	24	+12	GaAsFET	\$109.95
SP144VD	144-148	<1.6	15	0	DGFET	\$59.95
SP144VDA	144-148	<1.1	15	0	DGFET	\$67.95
SP144VDG	144-148	<0.55	24	+12	GaAsFET	\$109.95
SP220VD	220-225	<1.9	15	0	DGFET	\$59.95
SP220VDA	220-225	<1.3	15	0	DGFET	\$67.95
SP220VDG	220-225	<0.55	20	+12	GaAsFET	\$109.95
SP432VDA	420-450	<1.9	15	-20	Bipolar	\$62.95
SP432VDA	420-450	<1.2	17	-20	Bipolar	\$79.95
SP432VDG	420-450	<0.55	16	+12	GaAsFET	\$109.95

"NEW"  
HIGH  
POWER  
RF  
FEEDTHRU  
PREAMPS!

ASK FOR  
BROCHURES

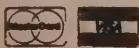
Every preamplifier is precision aligned on ARRI's Hewlett Packard HP8970A/HP346A state-of-the-art noise figure meter. RX only preamplifiers are for receive applications only. Inline preamplifiers are rf switched (for use with transceivers) and handle 25 watts transmitter power. Mount inline preamplifiers between transceiver and power amplifier for high power applications. Other amateur, commercial and special preamplifiers available

In the 1-1000 MHz range. Please include \$2 shipping in U.S. and Canada. Connecticut residents add 7 1/2% sales tax. C.O.D. orders add \$2. Air mail to foreign countries add 10%. Order your ARRI Rx only or inline preamplifier today and start hearing like never before!

Advanced  
Receiver  
Research

PLEASE MENTION THIS AD IN THE SPEC-COM JOURNAL

Box 1242 • Burlington, CT 06013 • 203 582-9409



## GORDON WEST RADIO SCHOOL

#04 21-DAY NOVICE . . . \$22.95

- 112-page textbook
- two stereo code learning tapes
- sample 5 wpm Novice code test
- over \$50 in radio manufacturers' discount coupons.

#01 COMPLETE NOVICE . . . \$62.95

- 2 theory tapes, 2 textbooks, FCC Rule Book, 4 code tapes, code oscillator set, examiner test packet, and over \$50 in radio discount coupons.

#02 NOVICE CODE COURSE \$32.95

- 6 cassette tapes make it easy to learn the code from scratch.

#07A 2-WEEK TECH . . . \$22.95

- This Technician course includes 2 theory tapes and 1 illustrated textbook.

#05 COMPLETE GENERAL . . . \$62.95

- 6 code tapes, 4 theory tapes, and 2 textbooks. Ideal for upgrade from Novice to General.

#06 GEN. CODE COURSE . . . \$32.95

- This General course includes 6 tapes for speed building from 5 to 13 wpm.

#08B COMPLETE ADVANCED \$62.95

- This Advanced course includes 4 theory tapes, 1 textbook, and 6 code tapes (13 to 22 wpm).

#09 ADV. THEORY COURSE \$32.95

- 4 tapes and 1 illustrated textbook

#10 COMPLETE EXTRA . . . \$62.95

- 4 theory tapes, 1 textbook, and 6 code tapes (13 to 22 wpm).

#12 EXTRA THEORY COURSE \$32.95

- 4 theory tapes and 1 illustrated textbook for Extra class theory.

#11 EXTRA CODE COURSE \$32.95

- 6 tapes for speed building from 13 to 22 wpm for the Extra code exam.

#13 BRASS KEY & OSC . . . \$25.95

#15 PLASTIC KEY & OSC . . . \$21.95

SINGLE CODE TAPES  
\$10.95 each including shipping

- #19 5 wpm Novice QSO tests
- #20 5 wpm Random Code
- #21 5-7 wpm Speed Builder
- #22 7-10 wpm Speed Builder
- #23 10 wpm Plateau Breaker
- #24 10-12 wpm Speed Builder
- #25 12-15 wpm Calls & Numbers
- #26 13 wpm Random Code
- #27 13 wpm Test Preparation
- #28 13 wpm Car Code
- #29 13-15 wpm Speed Builder
- #30 15-17 wpm Speed Builder
- #31 17-19 wpm Speed Builder
- #32 20 wpm Random Code
- #33 20 wpm Test Preparation
- #34 20 wpm Car Code
- #43 3-15 wpm Code Review
- #40 12-21 wpm Code Review

Prices include  
shipping & handling  
IL residents add 6 1/2%



RADIO AMATEUR CALLBOOK INC.

925 Sherwood Dr., Lake Bluff, IL 60044

Mon.-Fri. 8-4pm (708) 234-6600



# The Monitoring Post

by Mike Donovan KA0JAW

## Listening Bits

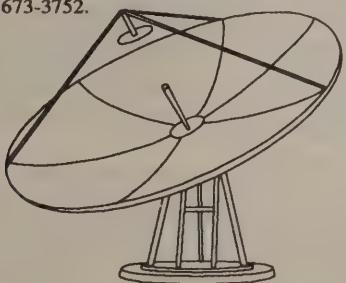
Because of the Mid-East conflict and positive publicity on short wave listening, there has been a 500% increase in the sales of shortwave receivers! With this kind of explosion in sales of receivers we will see a swelling of the ranks to our hobby. What a great time to expand the coverage of short wave listening and scanner monitoring in the pages of Spec-Com! We are actively soliciting articles and regular column writers for this segment of specialized communications. Send those stories, construction articles, frequency tips, and news items to us today!

Radio Netherlands is broadcasting in AM compatible SSB on 15.560 KHz (Upper SSB) from about 0030 to 0125. Those listening on AM will notice only slight decay of quality but those listening on SSB will not notice any quality loss. There is a special QSL card available from Radio Netherlands, but a detailed audio report is requested. This mode of operation will be evaluated by the staff of Radio Netherlands over the summer (through June) to determine if they will continue beyond that point. For QSL: Bonaire SSB Evaluation, Frequency Bureau, Radio Netherlands, Box 222, 1200-JG Hilversum, Netherlands.

A new edition of the Guide To Utility Stations is now available. The revised 9th edition includes new channelling plans for the extensive frequency transition in the Maritime Mobile Service that will take place on 0001 UTC 01 July 1991. The schedules of FAX stations are new or updated. Technical information of new ARQ and FEC systems are covered. All this and much more is in the many publications offered. For more information contact: Klingefuss Publications, Hagenhoher Str. 14, D-7400 Tuebingen, Germany. Klingefuss Publications is the monitoring expert offering international publications. When you contact them for their catalog, let them know you read about it in Spec-Com!

## Something New

Q.S.O. Amateur Radio is a satellite delivered program of interest to amateur radio operators and monitoring enthusiasts. This program is on GTE Spacenet 1 communications satellite, channel 15. Plans are underway for possible expansion of broadcasts to five nights a week! Broadcasts are from 9:00 to 12:00 PM EST on Monday evenings. With live phone call in, interesting video productions, and helpful information, this program is a must. For more information you can call Jim Bass at (315) 673-3752.



## WEFAX News

China launched its second polar orbiting meteorological weather satellite Feng Yun 1-2. While the signals have been seen here in the Midwest, operation is not regular. A severe attitude control problem has been reported that has caused the bird to be inoperative. A reported frequency of 137.795 is used. Meteor 2-16 and 2-19 have been active on 137.850 as of late.

## A Date to Remember

Remember the 1991 Monitoring Times Convention is scheduled for October 4, 5, & 6th at the Hyatt Regency in Knoxville, Tennessee. Make your plans now to attend by contacting Monitoring Times. Attendance is limited.

## Reports

On Sundays, Italian Radio Relay Service can be heard in English on 9815 at 0815 and 1230 UTC. Daily you can find The Voice Of Free Iraq from 0330 to 0800 and from 1430 to 2100 UTC on 17940, 15600, and 9517 KHz.

The Clandestine station of the Voice of the Palestine Islamic Revolution and the Islamic Republic of Iran has been reported on 9610. Radio DVR from Khabarovsk USSR has been reported on 4790. While we are on Clandestine stations, there has been reports of Radio Free North America showing up on 7415 and 7416. A lot of number stations have been heard again on 7880. Reports of strange packet signals are comming in. It looks like the ham packet terminal node controllers are being found for other things. More on this later as it comes in.

## Dayton 1991

The 1991 Dayton hamvention was filled with toys for the listening enthusiast this year. The flee market offered m many of the oldies but goodies while the main floors sparked with portable and base receivers. Every year I meet more and more people that are interested in monitoring. The weather receiving systems made a big splash this year with Spectrum International introducing the new version of the Timestep system from England and David Schwitteck showing their fine wares. Many of the satellite people were on hand with the latest and greatest receiving equipment. Computer software (and hardware) for the listening hobbyist was much more plentiful this year. A lot of interest in the Spec-Com Journal was seen this year by monitoring ranks. There were two forums for the short wave listeners this year with one on Saturday and one on Sunday.

## Scanning

We have had a question from a reader asking for the known frequencies for the base units of cordless phones. Here they are.

46.610  
46.630  
46.670  
46.710  
46.730  
46.770  
46.830  
46.870  
46.930  
46.970



## Fax facts

If you are looking for another application for your general coverage communications receiver try facsimile. The better your receiver and antenna system the better your reception but even budget systems can produce good facsimile (fax) pictures

There are many fax transmitting stations located throughout the world that are transmitting in the HF region (3 - 29 Mhz). Some transmit 24 hours per day and others are on schedules.

The fax transmissions are frequency modulated signals that can be received by your HF receiver and a demodulator. Several computerized systems are available to receive this information. AEA's Pakratt and Schwitteck's systems are only two of the many available.

There are stations transmitting weather, commercial, military, and press information. Weather, however is the most common found on HF.

Here are a few of the frequencies to try. We will publish more in future articles. Fax transmissions (F4 emission) is transmitted at 120 scans per minute unless otherwise noted. 3289.5 and 4782 Bracknell, U.K. - 4975 and 8080 Norfolk, V.A.

## New WEFAX Product

Timestep Weather systems of England announced their new systems for WEFAX use. These systems are distributed by Spectrum International of Concord, Mass. (508-263-2145) and really looks like a winners!

The Timestep systems represent the current state of the art. The VGASAT4 is an improved version of the small half sized PC card that will allow the display on IBM PC type computers of APT signals from Meteosat, GOES, NOAA, and the Soviet polar Meteor and Okean satellites. This system includes the card, receiver for 1691 (137 MHz also available), Low noise pre amp, low loss coax, and software. Everything (except the computer) that you will need includding antenna. The HRPT system is a complete image processing system for the noise-free digital HRPT transmissions from NOAA. With a ground resolution of just 1.1km that allows images to be received in incredible clarity. Complete systems are available. Timestep and Spectrum International are helpful and great people to deal with. Let them help you get started or improve your station today. WEFAX will add a whole new world to your monitoring post. Look for much more on this interesting mode in the pages of the Spec-Com Journal.

# WA2OQJ

AL  
R.T.T.Y.



## "RTTY AUTOSTART COLUMN"

Al LaVorgna WA2OQJ  
21 Kuhl Avenue, Hicksville, New York 11801

### RTTY AT WAR WITH PACKET AND AMTOR?

If you have not operated RTTY mode for awhile, you may be surprised to learn your favorite frequency is now occupied by strange burps known as Packet. When you tune lower in your attempt to escape the racket, you will find yourself attacked by another pulsing tone called Amtor. I am not one to recommend frequency fencing, but this slow encroachment of the RTTY segment takes the "gentlemen" out of agreement. It seems that the packet stations are settling down in the land of 14.100 kHz to as far south as 14.085. Amtor stations have been heard as high as 14.080. Give us a break guys. Looks like it is turning into a range war with the sheephearers homesteading on the old cattle ground. This "invasion" is not happening just on 20 but also 10 & 15. Conflicting Packet and RTTY signals just amounts to a lot of time-outs for packets and hits on RTTY. I have just received a strong letter from Rich Collins, NT6V, about this situation and he has researched it quite readily. I present it here in this month's column.

I sincerely hope the ARRL will come forth with some reasonable solution preferably before the FCC does. It is troublesome enough to co-exist with the normal QRM, without fighting among ourselves. Every mode has its flaws and its merits. Let us prove to ourselves and others that we can co-exist and that no one mode is so superior as to demand an excessive portion or even a dedicated section for its own exclusive use. Always remember that the WARC is always waiting in the wings ready to pounce upon the prize while we are fighting among ourselves.

Looking around under my desk a few days ago, I discovered a pile of manuals for the old 28 teletype machine. I know at least 4 local hams who have 28's in mint condition, and the old clunkers are performing just fine. DX contacts also confirm that there are many Model 15, 26, 28 and 32's machines still out there clanking away. There is more smoke coming from them than from Iraq. How come these machines can last so long while most auto's produced in the same year are rusting in the scrap heap? If you have need for these old 28 Manuals you can have them for the postage (about \$5). I'm in the book.

"Ritty" the rat, who always shows up somewhere in my RTTY Autostart cartoon, has stated he wishes to appear on my "special" QSL card for RTTY contacts. Pen is now in hand and ready to create a new card featuring "Ritty, so catch me on the air in the RTTY mode and mention my old friend and I will put you on the mailing list.

ARTICLE BY RICH COLLINS NT6V  
SUBMITTED TO SPEC-COM VIA WA2OQJ

### CAN RTTY SURVIVE PACKET & AMTOR?

Until the advent of the microprocessor and the personal computer, human beings were in control of the RTTY subbands. A combination of software and hardware has created a digital revolution in amateur radio. Recent action by the Norfolk office of the FCC has underscored the fact that each licensed operator is responsible for

### The RTTY Journal

For all the latest Amateur DIGITAL Communication News, RTTY DX Activity Reports, Mode Columnists, Software & Equipment Reviews, MSO Mailbox Status Updates and lots more!

Now published by Dale Sinner W6IWQ 10 times per year. \$15.00 U.S., Mexico, Canada. Air \$18.00. Foreign Surface \$22.00. Foreign Air \$30.00. Checks drawn on U.S. banks or Money Orders accepted.

The RTTY Journal  
9085 La Casita Avenue,  
Fountain Valley, CA 92708  
Phone: (714) 847-5058  
FAX: (714) 892-2720

complying with Part 97. According to The W5YI Report, 11 amateurs were cited for using Amateur Packet Radio for business communications. A Pennsylvania political activist, who is also a ham, allegedly transmitted a packet message advertising an Area 900 telephone number for THE COALITION TO STOP U.S. INTERVENTION IN THE MIDDLE EAST. The Sysop of the local Packet BBS who accepted the illegal traffic stated that he could not remove it from his computer until the next day because he was not at home when the message arrived. Another who relayed the same message erased it only after he had returned home from vacation in Florida. His computer-controlled station continued forwarding the traffic for five or six days. A VIP member of the Packet Establishment who received the Notice of Violation explained that his station switched 10,000 pieces of traffic every month and said there was no way he could account for every message.

In February of 1988, the FCC granted Special Temporary Authority (STA) to approximately 120 Amateurs to operate automated, unattended, limited-power, experimental stations in very narrow segments of the HF bands. Each subsequent year and again in January of 1991, the FCC extended that "temporary" authority to the same individual stations, while reiterating that they are still at work on new rules to suit themselves. They have mistakenly assumed that their unattended operation were incorporated with the STA, and, as if further to demonstrate their ignorance, they have launched a concerted effort to eliminate RTTY. Legitimate RTTY operations are abused by unattended packet stations which transmit without regard to whether the frequency may already be in use. Many of the intruders do not have the requisite STS from the FCC. Those of us who respect the tradition of amateur radio ethics often wonder what became of the "gentlemen's agreement" which prevailed, literally, for decades.

No FCC-licensed amateur may allow his station to transmit unless he is in direct physical control of it. (An exception, of course, is a repeater, which is presumed to be under remote control of a licensed operator.) A licensed control operator must be physically present at each and every station which originates and receives traffic. This caveat applies not only to the HF bands but to all amateur frequencies. Would you lend your H-T to an unlicensed person and authorize him to use your call sign while you are not present? No rule permits a computer or a TNC to be in charge of a station while the operator is absent.

We have been waiting for the FCC to make those new rules since January, 1988. New rules are needed to define unattended operations and to set aside segments of the bands for their use—and they don't have to take away the RTTY sub-bands to do it. If Packet Radio is truly the greatest thing since sliced bread, it makes good sense to allocate exclusive segments to its practice. The time has come to modernize the rules and get a band plan which will benefit all of us.

Rich Collins NT6V Feb. 22, 1991

EXPLORING THE UNIVERSAL M1000 DECODER CARD  
by Al LaVorgna WA2OQJ

We, as amateurs, are so busy with our little share of the radio spectrum, that we forget the wealth of interesting information that is just waiting to be deciphered. My attitude has always been, "If you can't talk back to 'em, who needs 'em?" We all started out as short wave listeners but today's avid SWL hears and sees things we never dreamed of.



**Universal Radio**  
1280 Aida Drive  
Reynoldsburg, Ohio

Toll Free: 800 431-3939  
\$399.95 (+\$5)

Do you want to read the news almost as soon as it happens? Do you want to print military traffic or ship to shore messages? Do you want to see press photos before they hit the presses? Perhaps you would like to see the earth from 600 miles up as satellites paint its portrait on your TV monitor in living color. These and many more exciting adventures can all come true with the newest innovation in digital decoding using the M1000 Decoder by Universal Radio in your personal computer.

With great anticipation, my board arrived by United Parcel and I found it to be well packaged with adequate insulation. Also packed with the board was a 70 page owners manual, a copy of the RTTY Listener's magazine, registration card for warranty and future modification literature. If you have experience with installing cards in computers, you will know how to take all the precautions in handling the board to prevent static discharge damage. Follow the detailed instructions in the book and you should have no difficulty.

The board will fit just about any IBM or clone, either XT or AT. My computer is the Epson Equity 1+ and the board fits well, except I had to replace the holding screw on top of the slot as it was a bit too high. It is a full card and took a bit of adjusting of the decoder board screws to make it fit snug. A cable to my Icom R71A communications receiver was all that was needed to complete the installation. I used the recorder jack as it provides a balanced output regardless of the AF gain. You may use any audio output, either record, speaker, or phone, but take care not to overload the input stages of the M1000. There is an input level on the screen for adjustment if, needed.

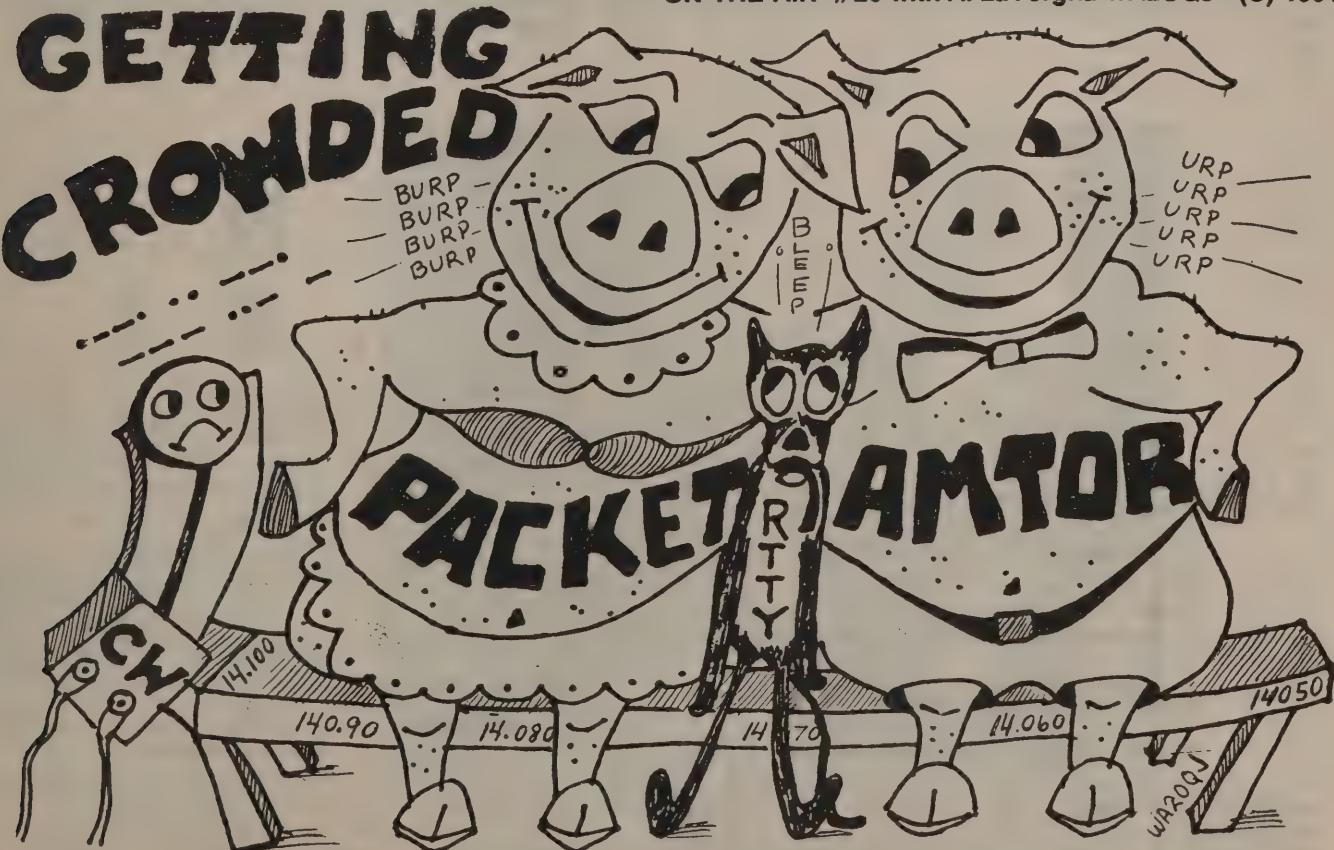
Software installation is simple. In my case using a VGA monitor with 9 pin Epson FX-86e printer, I used the existing default settings and all worked well. Different computers, monitors, and printers, may require modifications in the software setup, but the step by step on screen instructions can be followed easily. I entered the completed software program into my Extree Gold Utility program as Decoder and Fax, hit Decoder, and was on my way with the first main screen, that is used to decode all digital modes except Fax, which is the second main screen.

Naturally my first goal was to read amateur RTTY. I tuned below 21.100 MHz, set the on screen, mode, speed and tune controls, and the first QSO was displayed loud and clear. Morse was received also with no more problem than any other decoder if you allow for poor fists and speed variables of the sender. This is less of a problem with commercial and military stations that send at predictable speeds. Next was SITOR, AMTOR, and ALQ modes. These are a bit more complex and difficult to tune, but all are accepted and decipherable with patience and perseverance. Allow yourself a free evening for this phase, as it requires a great deal of experimental tuning to nail down these codes, as there are many variables. I am saving the dessert for last. With apologies to Fred Sharp, WB8ASF, who handles the SSTV/FAX column, I was anxious to use the FAX portion of the board. I tuned to 8077.8 MHz and as usual, Norfolk NOAA was received 20 plus. Made the proper parameter entries, hit Run, and my screen was alive with weather charts. Then came time for the satellite picture and a beautiful depiction of the globe, full disc, was painted on my screen. This alone is worth the cost of the board. All FAX screens can be saved to disc and get this; they can be titled, colorized, zoomed in and printed. Printing is not a plus however, as the rendering is only black and white, not duplicating the 16 shades of gray that is visible on the screen. No comparison to my M800 decoder that prints full gray tones but does not work with a computer as it interfaces directly to the printer. Maybe someday the board will be modified to print gray tones to graphic compatible printers.

Using a VGA monitor, you have the ability to colorize the image of the earth. There is no relationship between the colors and true colors as they would be seen from outer space. It merely emphasizes the different shades of gray to help identify the individual cloud layers. Make sure you select Blue as one of your choices, as blue and white give the most natural appearance to the earth as seen from outer space. Zooming in does not degrade the PIX, as there are plenty of extra pixels to keep the enlarged image exceptionally clear.

The Universal's M1000 Digital Board is the ultimate for receiving digital imaging. It does the work of other systems costing many times the price. Most of the latest transceivers have general coverage capabilities, so if you want some fresh viewing and more productive use of your PC, the M1000 may be a well invested choice. At the present time I am building Dr. Ralph Taggarts (WB8DQT) Zapper antenna for 136 MHz. I hope to receive direct telemetry from the many polar satellites on these frequencies. I will let you know how the M100 will perform decoding these PIX. Happy decoding..... Al.WA2OQJ

"ON-THE-AIR" #20 with Al LaVorgna WA2OQJ - (C) 1991



## "FROM THE WORKBENCH" Column

by John P. Lutz N9JL  
3275 Kirchoff Road - Apt. 332  
Rolling Meadows, IL 60008

Hello fellow specialized operators! My first column will be a bit short. Our editor WB0QCD said he would "squeeze" me in some place in this issue but space would be very tight. "SPEC-COM" has been expanding so much lately with renewed interest that I am told that they will be going to a new increased 80-page format in the next issue to better accomodate ALL regular columns and technical article space! This page then, is a mere teaser of better things to come. There is a lot of interest in ATV/Packet Ballooning and it seems some group or club from nearly every part of the country is doing it. Many of you have heard that I have been talking about doing a "BALLOON NEWSLETTER" of some kind on 40/80 meters that would offer much more details of behind the scenes building and planning of such events. I submitted some of this material to another major Ham magazine but apparently they did not have room or interest to print it. SPEC-COM has offered to print what I send them and so, here I am with a regular column instead of a newsletter.

This is PART ONE of a 3 PART series about ATV Ballooning. In this issue, I'll cover most of the details behind the N9JL/B DRIFTER 1 BALLOON FLIGHT that launched from a farm in White Heath, IL on December 1, 1990. In my JUL/AUG and SEP/OCT columns, I'll go into more detail about Reception Reports, the CW ID/Message board generator used, a schematic diagram and discussion of the on-line 10 meter CW transmitter and I will go into a technical discussion of lithium cells. Later on, I'll tell you all about my latest project in ATV Ballooning, that of the installation and interfacing of a LORAN navigation system. After I "balloon out", we will get into other interesting "building projects" to keep you busy at the workbench!

### N9JL/B DRIFTER 1 BALLOON FLIGHT

Our balloon carried a 39 ounce electronic payload developed by 3 hams from suburban Chicago. Also attached to the balloon were a 48" plastic parachute and a radar reflector produced by two other hams. The reflector provided a cross section sufficient for tracking by the ATC radars used at major airports. Collectively, these articles became "DRIFTER 1". During its 2 hour 16 minute flight, DRIFTER 1 transmitted outside temperature and a fixed 45 second message using the following hardware: poly-carbonmonofluoride/lithium cells (9 total), temperature controlled cw message/ID board and a crystal controlled transmitter.

Poly-carbonmonofluoride/lithium cells were chosen as the system power source because of their high voltage, high energy density and excellent low temperature performance. With an open circuit voltage twice that of carbon/zinc and an energy density (the relationship between available energy and weight) nine times that of carbon/zinc, lithium anode cells are hard to beat. Couple these points with the fact that they can produce useable power levels in temperatures as low as -40 degrees and their selection becomes unavoidable.

The temperature controlled message/ID circuit board was designed such that, over the range of +25 to -65 degrees celsius, the transmission repetition rate would decrease 0.5 second for every degree of temperature decrease. With the period set for 50 seconds at +25 degrees, the period thus became 95 seconds at -65 degrees. This approach worked very well and produced data that closely matched those taken earlier that morning by a National Weather Service radiosonde launched from Peoria, Illinois.

The transmitter, a subtly modified "2-FER", produced an output of 1.1 watt on 28.866 MHz. The simple approach of its crystal controlled Pierce oscillator, 2N4401 buffer amplifier and 2N3553 final amplifier proved well capable of handling both high SWRs and extremely low temperatures. Some chirp was noted, but nothing excessive considering the system power source (all nine cells) weighed less than 4.5 ounces.

DRIFTER 1 was, and is, the only BCAR experiment to be heard on three continents. The furthest known reception point is over 4200 miles distant, in Keaau, Hawaii. Its average speed of 72+ mph (164 miles traveled in 2.267 hours) is probably a record, too. All things considered, not a bad beginning for the boys from the windy city.

MORE ON THIS FLIGHT IN THE NEXT ISSUE!

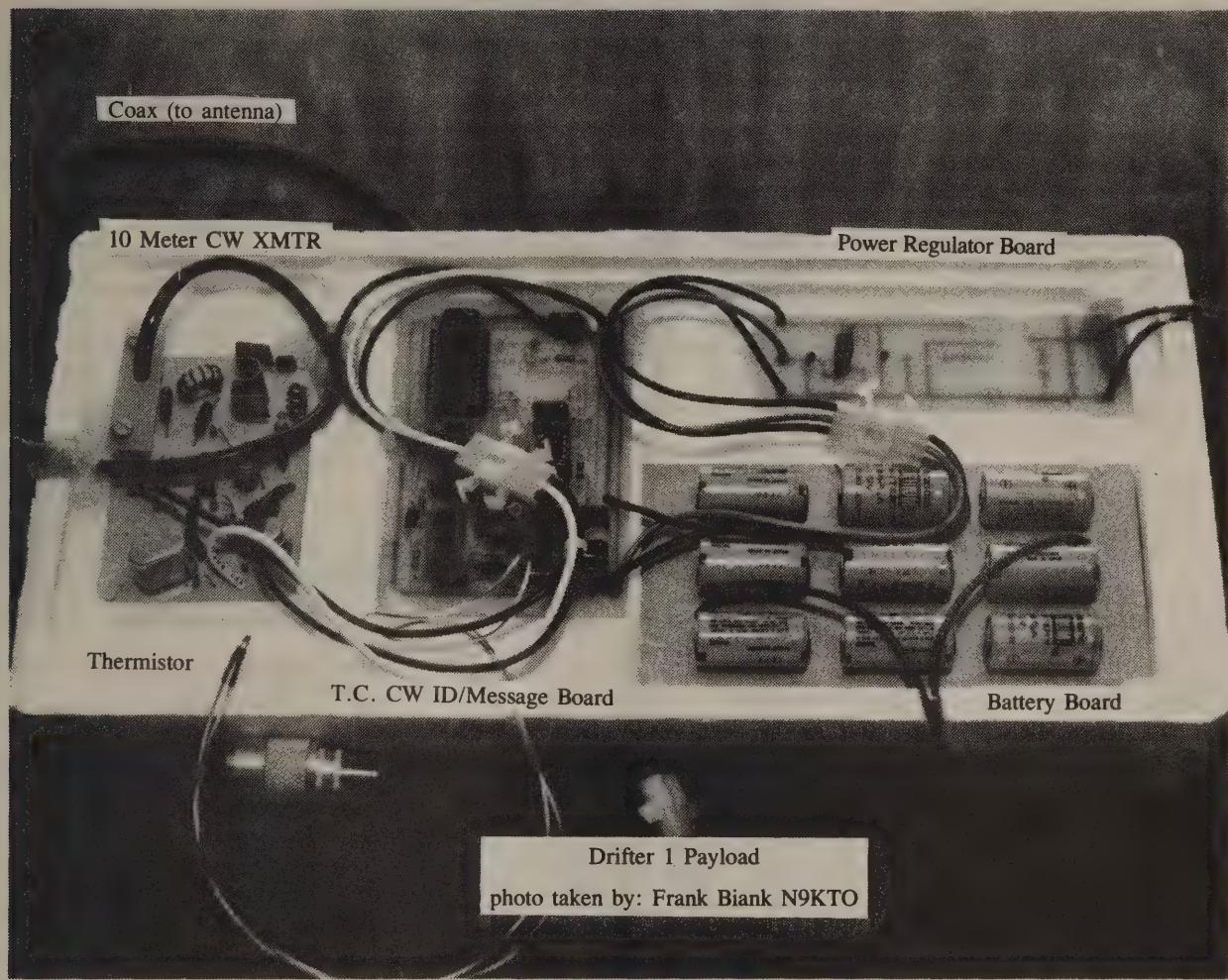


Commemorative DRIFTER 1 patches are available.  
Contact N9JL or KA9SZX.

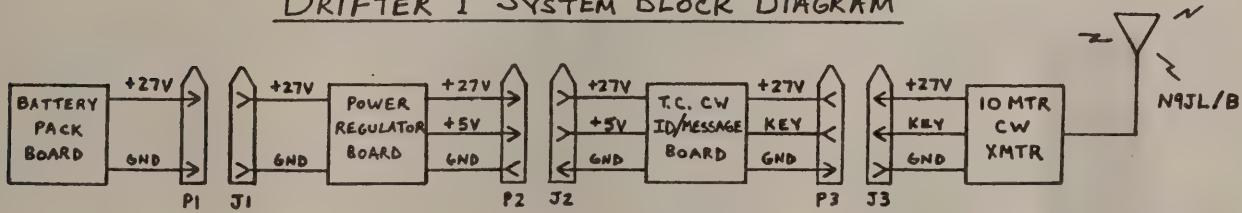


Part of the DRIFTER 1 Balloon Launch & Tracking Team  
N9JL KA9SZX KA9SY N9KTO N9KTE WE9E NJ9Y N9US

N  
9  
J  
L  
/  
B  
  
D  
R  
I  
F  
T  
E  
R  
1



DRIFTER 1 SYSTEM BLOCK DIAGRAM




**QSL**
CUSTOM  
FULL  
COLOR  
CARDS

AA6ZF      Where the  
pavement  
ends...  
...and the  
West begins

**\$69.95**      Actual size 3 1/2" x 5 1/2"  
500 COLOR QSLs  
Quantity discounts are also available!  
CALL TOLL FREE 1-800-869-7527  
or write for info. kit  
**VISUAL CONCEPTS**  
218 Delaware, Suite 301 Kansas City, MO 64105

**HM-10 DUAL**

BUILT-IN SWITCH  
SELECTS EITHER  
HEIL HC-5 OR  
HC-4 KEY  
ELEMENTS.  
IDEAL SYSTEM  
FOR 600 OHM  
FAST SCAN TV

**HEIL SOUND** Producing the world's most articulate audio

THE microphone of the 90's, be it lengthy rag chews with the gang or capturing the top of the pileups, the HEIL HM-10 is the microphone for you!

Specify your radio—HEIL will install mating connector.

ORDER LINE 618-295-3000  
#2 Heil Drive, Marissa, IL 62257

Watch for Bob Heil K9EID, TV Audio Improvement articles, soon to appear in SPEC-COM!  
Catch Bob on "QSO AMATEUR RADIO" Show, Spacenet 1, Channel 15 Monday nights.

# SPACE TALK!

## OSCAR, NASA and FOREIGN SATELLITE News Column

by Joe Holman KA7LDN  
P.O. Box 37,  
Redmond, WA 98073

I'd like to thank all the Spec-Com readers who sent correspondences in the last couple of months. All of your suggestions and questions were quite interesting; and I'm glad that my article is creating more interest and enthusiasm in the amateur satellite communications area! Please continue to communicate to me via the above address. Now for the latest space news...

### New MIR Crew

During the last month, the Soviets sent a new crew to the Soviet MIR space station. This new crew included a UK citizen, Helen Sharman, who is using the call GB1MIR. Others in the new crew include: Sergey Krikalev (USMIR) and Anatoly Arcebarsk (UTMIR). Musa and Helen were scheduled to return to Earth on May 26th, 1991. Continue to listen for amateur communications on 145.550 MHz on FM voice and AFSK packet with an common ham 2m receiver or scanner. Also, look for communications on 432.675 MHz in the near future. ICOM of America donated a 70cm transceiver to the hams onboard MIR.

### Near Space Balloon/Rocket ATV Experiment

On Saturday May 18th at 6:00 AM EDT, students at Southeastern Community College in Whiteville, North Carolina were planning to launch a 50 foot diameter helium balloon up to 90,000 feet. The balloon carried a 10 foot rocket (hence the name ROCKOON) which the students ignite at this altitude. Since the rocket was above most of the Earth's atmosphere at this point, the rocket would fly up to around 350,000 feet. The launch site was on the shoreline of North Carolina near the Wilmington area. The ROCKOON was planned to drift out over the ocean before the rocket was ignited. Total flight time of the ROCKOON was planned to be about 2 hours (1.5 hours to reach altitude and 30 minutes to parachute back down). Onboard the rocket was two ATV transmitters (439.25 MHz AM ATV and 1255 MHz FM ATV). Two TV cameras pointed out at different angles to hopefully send back some very spectacular footage of the flight. One of the cameras was a color camcorder which will also video tape the flight in case the rocket is recovered. The callsign on the ROCKOON downlinks was KC4WDW. In addition to the ATV experiment, a packet radio telemetry downlink



SPEC-COM Journal "SPACE NEWS" Columnist Joe Holman KA7LDN

operated on 144.440 MHz. Altitude, temperature and battery status will be received via this link. If anyone received signals from the ROCKOON, send a QSL card to the following address:

Southeastern Community College  
Attn: Ben Frink, Hwy 74 West  
Whiteville, NC 28472

### New AO-13 Spring Schedule

Here is AO-13's spring transponder schedule which expected to continue through early summer:

Mode-B : MA 000 to MA 095  
Mode-JL : MA 095 to MA 125  
Mode-LS : MA 125 to MA 130  
Mode-S : MA 130 to MA 140  
Mode-B : MA 140 to MA 256

Omnis : MA 240 to MA 030

During Mode-S, the Mode-B transponder will be turned off.

AO-13's current attitude is now: BLON = 179.5 BLAT = 0

### Satellite Keplerian Elements (Partial Listing)

For a full listing - send a SASE to Joe's address up front.

Satellite: AO-10  
Catalog number: 14129  
Epoch time: 91121.60065856  
Element set: 671  
Inclination: 25.8131 deg  
RA of node: 148.0591 deg  
Eccentricity: 0.6035385  
Arg of perigee: 238.5955 deg  
Mean anomaly: 48.7305 deg  
Mean motion: 2.05930413 rev/day  
Decay rate: -1.48e-06 rev/day<sup>0.2</sup>  
Epoch rev: 3128

Satellite: UO-11  
Catalog number: 14781  
Epoch time: 91133.09719307  
Element set: 15  
Inclination: 97.9007 deg

RA of node: 179.2177 deg  
Eccentricity: 0.0011388  
Arg of perigee: 283.4910 deg  
Mean anomaly: 76.5064 deg  
Mean motion: 14.66881478 rev/day  
Decay rate: 2.130e-05 rev/day<sup>0.2</sup>  
Epoch rev: 38430

Satellite: RS-10/11  
Catalog number: 18129  
Epoch time: 91133.86094035  
Element set: 645  
Inclination: 82.9254 deg  
RA of node: 84.2210 deg  
Eccentricity: 0.0010297  
Arg of perigee: 284.2719 deg  
Mean anomaly: 75.7355 deg  
Mean motion: 13.72185621 rev/day  
Decay rate: 2.03e-06 rev/day<sup>0.2</sup>  
Epoch rev: 19488

Satellite: AO-13  
Catalog number: 19216  
Epoch time: 91121.30113593  
Element set: 271  
Inclination: 56.8390 deg  
RA of node: 97.0967 deg  
Eccentricity: 0.7167973  
Arg of perigee: 253.2812 deg  
Mean anomaly: 22.8340 deg  
Mean motion: 2.09698033 rev/day  
Decay rate: 1.18e-06 rev/day<sup>0.2</sup>  
Epoch rev: 2204

Satellite: FO-20  
Catalog number: 20480  
Epoch time: 91129.94007955  
Element set: 221  
Inclination: 99.0269 deg  
RA of node: 119.3631 deg  
Eccentricity: 0.0541409  
Arg of perigee: 28.2030 deg  
Mean anomaly: 334.7299 deg  
Mean motion: 12.83179903 rev/day  
Decay rate: 3.2e-07 rev/day<sup>0.2</sup>  
Epoch rev: 5865

Satellite: AO-21  
Catalog number: 21087  
Epoch time: 91133.81186106  
Element set: 78  
Inclination: 82.9399 deg  
RA of node: 259.1534 deg  
Eccentricity: 0.0035641  
Arg of perigee: 356.9935 deg  
Mean anomaly: 3.0998 deg  
Mean motion: 13.74381140 rev/day  
Decay rate: 1.70e-06 rev/day<sup>0.2</sup>  
Epoch rev: 1430

Satellite: RS-12/13  
Catalog number: 21089  
Epoch time: 91133.46583047  
Element set: 78  
Inclination: 82.9231 deg  
RA of node: 129.8477 deg

Eccentricity: 0.0030550  
 Arg of perigee: 18.6709 deg  
 Mean anomaly: 341.5560 deg  
 Mean motion: 13.7896153 rev/day  
 Decay rate: 1.54e-06 rev/day<sup>2</sup>  
 Epoch rev: 1337

Satellite: UO-14  
 Catalog number: 20437  
 Epoch time: 91133.211636294  
 Element set: 385  
 Inclination: 98.6642 deg  
 RA of node: 212.8747 deg  
 Eccentricity: 0.0010586  
 Arg of perigee: 271.6760 deg  
 Mean anomaly: 88.3190 deg  
 Mean motion: 14.29109157 rev/day  
 Decay rate: 7.07e-06 rev/day<sup>2</sup>  
 Epoch rev: 6799

Satellite: AO-16  
 Catalog number: 20439  
 Epoch time: 91133.46358390  
 Element set: 283  
 Inclination: 98.6729 deg  
 RA of node: 213.4054 deg  
 Eccentricity: 0.0011818  
 Arg of perigee: 283.5451 deg  
 Mean anomaly: 76.4377 deg  
 Mean motion: 14.29199339 rev/day  
 Decay rate: 7.96e-06 rev/day<sup>2</sup>  
 Epoch rev: 6803

Satellite: DO-17  
 Catalog number: 20440  
 Epoch time: 91130.08565512  
 Element set: 282  
 Inclination: 98.6733 deg  
 RA of node: 210.1144 deg  
 Eccentricity: 0.0010742  
 Arg of perigee: 286.2761 deg  
 Mean anomaly: 73.7239 deg  
 Mean motion: 14.29275385 rev/day  
 Decay rate: 7.73e-06 rev/day<sup>2</sup>  
 Epoch rev: 6755

Satellite: WO-18  
 Catalog number: 20441  
 Epoch time: 91130.19691534  
 Element set: 280  
 Inclination: 98.6709 deg  
 RA of node: 210.2741 deg  
 Eccentricity: 0.0011136  
 Arg of perigee: 283.4866 deg  
 Mean anomaly: 76.5078 deg  
 Mean motion: 14.29322126 rev/day  
 Decay rate: 6.34e-06 rev/day<sup>2</sup>  
 Epoch rev: 6757

Satellite: LO-19  
 Catalog number: 20442  
 Epoch time: 91130.73338203  
 Element set: 281  
 Inclination: 98.6710 deg  
 RA of node: 210.8630 deg  
 Eccentricity: 0.0011468  
 Arg of perigee: 281.6246 deg  
 Mean anomaly: 78.3646 deg  
 Mean motion: 14.29398832 rev/day  
 Decay rate: 6.21e-06 rev/day<sup>2</sup>  
 Epoch rev: 6765

Satellite: NOAA-9  
 Catalog number: 15427  
 Epoch time: 91131.38724761  
 Element set: 779  
 Inclination: 99.1703 deg  
 RA of node: 144.0195 deg  
 Eccentricity: 0.0015464  
 Arg of perigee: 164.0795 deg  
 Mean anomaly: 196.0872 deg  
 Mean motion: 14.12992993 rev/day  
 Decay rate: 4.51e-06 rev/day<sup>2</sup>  
 Epoch rev: 33032

Satellite: NOAA-10  
 Catalog number: 16969  
 Epoch time: 91128.07869586  
 Element set: 629  
 Inclination: 98.5678 deg  
 RA of node: 153.2991 deg  
 Eccentricity: 0.0014451  
 Arg of perigee: 47.7612 deg  
 Mean anomaly: 312.4791 deg  
 Mean motion: 14.24111172 rev/day  
 Decay rate: 7.22e-06 rev/day<sup>2</sup>  
 Epoch rev: 24084

Satellite: MET-2/17  
 Catalog number: 18820  
 Epoch time: 91133.85047350  
 Element set: 527  
 Inclination: 82.5409 deg  
 RA of node: 87.5911 deg  
 Eccentricity: 0.0017690  
 Arg of perigee: 111.7533 deg  
 Mean anomaly: 248.5516 deg

Mean motion: 13.84479940 rev/day  
 Decay rate: 1.82e-06 rev/day<sup>2</sup>  
 Epoch rev: 16593  
 Satellite: MET-3/2  
 Catalog number: 19336  
 Epoch time: 91133.76006336  
 Element set: 779  
 Inclination: 82.5432 deg  
 RA of node: 43.5504 deg  
 Eccentricity: 0.0016104  
 Arg of perigee: 203.8368 deg  
 Mean anomaly: 156.2005 deg  
 Mean motion: 13.16924427 rev/day  
 Decay rate: 8.9e-07 rev/day<sup>2</sup>  
 Epoch rev: 13446

Satellite: NOAA-11  
 Catalog number: 19531  
 Epoch time: 91134.05635621  
 Element set: 531  
 Inclination: 99.0276 deg  
 RA of node: 88.5918 deg  
 Eccentricity: 0.0013179  
 Arg of perigee: 74.0823 deg  
 Mean anomaly: 286.1797 deg  
 Mean motion: 14.12138412 rev/day  
 Decay rate: 8.48e-06 rev/day<sup>2</sup>  
 Epoch rev: 13565

Satellite: MET-2/18  
 Catalog number: 19851  
 Epoch time: 91133.54722445  
 Element set: 479  
 Inclination: 82.5236 deg  
 RA of node: 325.2327 deg  
 Eccentricity: 0.001429  
 Arg of perigee: 152.5678 deg  
 Mean anomaly: 207.6237 deg  
 Mean motion: 13.84132298 rev/day  
 Decay rate: 1.88e-06 rev/day<sup>2</sup>  
 Epoch rev: 11126

Satellite: MET-3/3  
 Catalog number: 20305  
 Mean motion: 13.83969195 rev/day  
 Decay rate: 3.44e-06 rev/day<sup>2</sup>

Epoch time: 91133.66108784  
 Element set: 377  
 Inclination: 82.5575 deg  
 RA of node: 344.9172 deg  
 Eccentricity: 0.0014953  
 Arg of perigee: 222.4102 deg  
 Mean anomaly: 137.5863 deg  
 Mean motion: 13.15953291 rev/day  
 Decay rate: 4.3e-07 rev/day<sup>2</sup>  
 Epoch rev: 7441

Satellite: MET-2/19  
 Catalog number: 20670  
 Epoch time: 91133.71230566  
 Element set: 229  
 Inclination: 82.5487 deg  
 RA of node: 26.2901 deg  
 Eccentricity: 0.0017606  
 Arg of perigee: 79.3634 deg  
 Mean anomaly: 280.9504 deg  
 Mean motion: 13.83969195 rev/day  
 Decay rate: 3.44e-06 rev/day<sup>2</sup>  
 Epoch rev: 4423

Satellite: FY-1/2  
 Catalog number: 20788  
 Epoch time: 91131.58759229  
 Element set: 191  
 Inclination: 98.9465 deg  
 RA of node: 165.8726 deg  
 Eccentricity: 0.0014521  
 Arg of perigee: 280.9083 deg  
 Mean anomaly: 79.0448 deg  
 Mean motion: 14.01146817 rev/day  
 Decay rate: 3.55e-06 rev/day<sup>2</sup>  
 Epoch rev: 3508

Satellite: MET-2/20  
 Catalog number: 20826  
 Epoch time: 91133.57058119  
 Element set: 180  
 Inclination: 82.5280 deg  
 RA of node: 325.4298 deg  
 Eccentricity: 0.0013499  
 Arg of perigee: 343.8916 deg  
 Mean anomaly: 16.1807 deg  
 Mean motion: 13.83343411 rev/day

Decay rate: 1.78e-06 rev/day<sup>2</sup>  
 Epoch rev: 3142  
 Satellite: MET-3/4  
 Catalog number: 21232  
 Epoch time: 91133.82078048  
 Element set: 19  
 Inclination: 82.5454 deg  
 RA of node: 248.7738 deg  
 Eccentricity: 0.0017202  
 Arg of perigee: 136.5395 deg  
 Mean anomaly: 223.7089 deg  
 Mean motion: 13.15983417 rev/day  
 Decay rate: 5.0e-08 rev/day<sup>2</sup>  
 Epoch rev: 260

Satellite: MIR  
 Catalog number: 16609  
 Epoch time: 91133.82840129  
 Element set: 466  
 Inclination: 51.6039 deg  
 RA of node: 101.5659 deg  
 Eccentricity: 0.0007934  
 Arg of perigee: 209.9173 deg  
 Mean anomaly: 150.1364 deg  
 Mean motion: 15.66925302 rev/day  
 Decay rate: 4.6175e-04 rev/day<sup>2</sup>  
 Epoch rev: 29978

Satellite: HUBBLE  
 Catalog number: 20580  
 Epoch time: 91132.80637884  
 Element set: 471  
 Inclination: 28.4732 deg  
 RA of node: 308.5458 deg  
 Eccentricity: 0.0005343  
 Arg of perigee: 319.5501 deg  
 Mean anomaly: 40.4686 deg  
 Mean motion: 14.87616478 rev/day  
 Decay rate: 5.263e-05 rev/day<sup>2</sup>  
 Epoch rev: 5704

Thanks to Bill Brown WB8ELK and AMSAT-NA information in this months article.



## AMSAT Has Established Amateur Radio As a Permanent Resident in Space!

From operating any of 12 Amateur satellites circling the globe today to participating in Amateur Radio activities from the Space Shuttle, the benefits of space based Amateur Radio are available to you by becoming an AMSAT member. Our volunteers design, build and launch state-of-the-art satellites for use by Radio Amateurs the world over. We provide educational programs that teach our young people about space and Amateur Radio. Most of all, we provide our members with an impressive array of member benefits including:

- Operating aides such as discounted tracking software and land line BBS.
- An extensive network of volunteers to provide you local technical assistance.
- The AMSAT Journal, your bi-monthly periodical devoted to the Amateur Space program.

### It's Fun! It's Easy! It's Exciting!

**JOIN TODAY.** For more information, call or write for your free information packet. Or send your dues now, check or charge: \$30 U.S., \$36 Canada/Mexico, \$45 all else. (\$15 towards the AMSAT journal.)

**AMSAT, P. O. Box 27, Washington, D.C. 20044**

(301) 589-6062; Fax: (301) 608-3410

## "ON-LINE COMPUTERS" Column

with Rich Bono NM1D  
#7 Redfield Circle, Derry, NH 03038

### THE BASICS & MODEM SOFTWARE FOR PACKET

If you are an Amateur Radio operator, and have a computer, you MUST have a terminal emulator. What is a terminal emulator you ask? Well, let's check a dictionary (The Little Oxford Dictionary of Current English, sixth edition): terminal 1 a. of or forming the last part or terminus; Med. forming or undergoing last stage of fatal disease; of or done etc. each term. 2. n. terminating thing, extremity; terminus; point of connection for closing electric circuit; air terminal; apparatus for transmission of messages to and from computer or communications system etc. emulate v.t. try to equal or excel; imitate. emulation n.; emulative a.; emulator n. I can say for certain that we are NOT trying to imitate a fatal disease! So a terminal emulator must be something that imitates an apparatus for transmission of messages to and from a communications system.

Lets start with the basics. First a few assumptions: 1) We want to communicate with other Amateurs via packet radio. 2) To communicate via packet radio, one needs a transceiver, TNC, and a terminal. Notice in item 2, I did not mention a computer. Most TNCs of today will interface with a dumb ASCII serial RS-232 terminal. A computer is not really needed (we will get to the computer in short time). What do I mean by "dumb ASCII serial RS-232 terminal"? Let me handle each word one at a time:

**dumb** - The terminal does not need to perform any special functions or contain any computational abilities. (You will not be using it to calculate the position of the OSCAR satellites!) **ASCII** - (pronounced "askey") This is the description of the character set that the terminal should operate with. There are several different character sets used by computers. ASCII is an acronym for American Standard Code for Information Interchange. It specifies how the characters A-Z, a-z, 0-9, and others will be represented. It actually only requires 7 bits of data to generate the entire ASCII character set. **BAUDOT** (pronounced "baudough", the "t" is silent) is an example of another character set that Amateurs may be familiar with. BAUDOT in contrast to ASCII requires only 5 bits of data to specify the entire character set, and contains NO LOWER CASE LETTERS. **serial** - This means that the data bits are transmitted in a series, one after another over a single wire (similar to how Morse code is transmitted, each

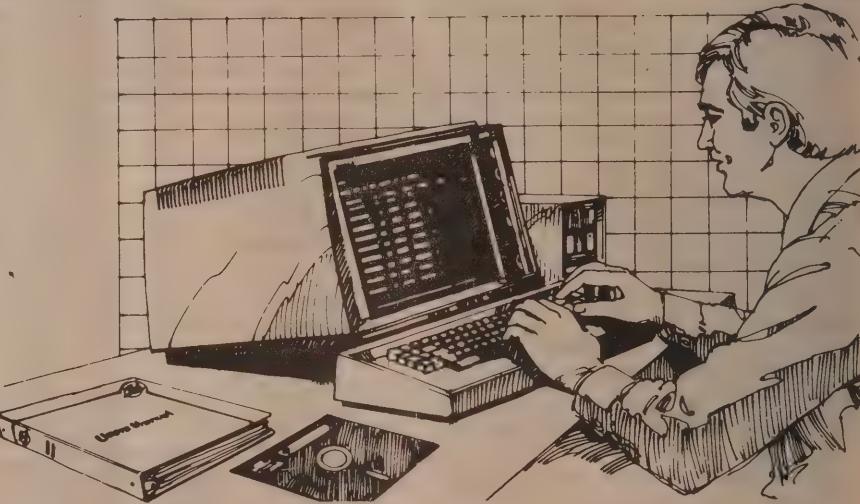
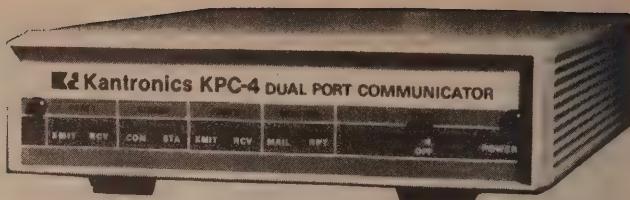
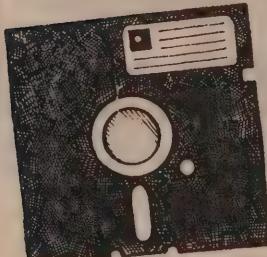
dot or dash is sent one at a time). The alternative to serial would be parallel where all data bits are transmitted at the same time, each needing its own wire or circuit. **RS-232** - This is an EIA (Electronic Industries Association) recommended standard which specifies the voltage levels that are to appear on the wires, and the connector pin or name that is to carry certain signals. Unfortunately, the RS-232 "standard" has been adapted to many uses and sometimes does not seem to be much of a standard. **terminal** - A terminal is a device used for communicating with another device (such as a computer or a TNC). It basically allows a human to interface with the computer/TNC. It consists of a keyboard to allow the user to input data to the computer/TNC, and a display of some type to allow the computer/TNC to output information to the user.

There are different types of terminals: **Printing terminals** use paper and a print mechanism as their output device (like a Teletype). **Video display terminals** (sometimes called VDT's) use a CRT (Cathode Ray Tube) as their output device. The terminal has two very simple jobs. 1) Send a signal out that represents each key pressed on its keyboard. 2) Receive signals from another device and display a character on its display device that represents the received signal. A dumb terminal only is capable of sending and receiving text. A 'smart' terminal may have other capabilities, such as displaying text in different colors, or perhaps doing other functions upon command. So a terminal is essentially electronic paper and an electronic pencil to allow you to "input" and "output" (communicate). For use with the average packet radio TNC, you only need the functions of a dumb terminal. If you are the type of person who is intimidated by computers, then you might be more comfortable using a dumb terminal with your TNC. Actually, I have friends that prefer to use a dumb terminal with their TNCs. This allows them to use their computer for other purposes while still keeping in touch with the packet network. The other advantage of using the terminal instead of the computer is that the terminal starts working immediately when it is turned on. There is no delay waiting for the computer to "boot up" and then to load the proper software.

### Next Issue: REVIEW OF AEA PC PAKRATT II

by WB0QCD

Just released! AEA Host Mode Terminal Program for the popular model PK-232MBX multi-mode Data Controller written for AEA by Dick Lichten KD4JP. Read all about it in our NEXT issue!



If you were going to start out with packet radio I would recommend that you use a computer instead of a terminal with your TNC. There are several reasons for this. 1) You can probably buy a computer for about the same money (or cheaper) than the cost of a new terminal. 2) The computer can be used for much more than packet radio, allowing you to further justify the expense of the computer. 3) The computer is much more versatile when used with packet radio. With the computer you can save incoming text and then send it back to your friends. With a terminal, once the text is received, you would have to type it back into the terminal to send it to another Amateur. 4) If you have a printer connected to your computer, you can print text received via packet radio for future reference.

By now you should be sold on the advantages of using a computer with your packet radio TNC. To use your computer with the TNC there are a few options that you might need to allow them to interface with each other. By interface, I mean connect or communicate. The first capability that your computer may need is an RS-232 serial port. With many computers this is a standard item. With others this is an optional extra. I consider a serial port (sometimes called a "COM" or communications port) to be a required option. A serial port can be used to interface with many devices besides a TNC. You might want a telephone modem for communicating with telephone BBS's, or you might want to interface with your HF rig to control it (yes many HF radios can be controlled via a serial port). Note that there are TNCs available that don't require a serial port. They are designed to plug directly into a card slot of the computer. These offer the advantage of not requiring you to purchase a serial port, and allowing you to reduce the number of interfacing cables and clutter on your operating desk. I prefer to use the external RS-232 type of TNC. There are several reasons for this, a couple of the stronger ones are: 1) I can use the TNC with other computers. The card type TNCs can only be used for the type of computer for which they are designed. RS-232 TNCs can be used with any computer that has a serial port (and most do). 2) I can leave the TNC on to collect messages 24 hours a day without having

to leave my computer turned on. Electricity is not cheap anymore! With an external TNC, you will also need a cable to connect between the computer serial port and the TNC. This is the same type of cable that can be used to interface with an external modem, and is not usually a special cable unique to the TNC.

Now that you have all the hardware that you need: 1) Transceiver 2) TNC 3) Computer with an RS-232 port 4) Cable for connecting between the TNC and the computer. Here is where the TERMINAL EMULATOR comes in. In this example what I call a terminal emulator is actually a program for the computer that makes the computer behave as if it is an RS-232 terminal. The terminal emulator software, causes text that you type on the keyboard to be sent to the TNC. And text that the TNC sends to the computer will be output to the computers display so that you can read it. This is similar to the functions that a dumb terminal perform. This is why this software is called "terminal emulation software", your computer is now pretending to be a terminal. Depending on the particular software that you use, the computer could make it very easy to perform many different functions that make packet radio use more interesting. Most computers have disk drives for storing of programs and data. Most terminal emulator software allows you to store incoming data onto the disk drive. This would allow you to store the data for later referral or to allow you to send it to one of your friends. Also, you could compose a letter to be sent at a later date on your computer, and then send it all at once, without having to type it into the TNC when you are connected to someone. This helps to automate traffic handling and other functions. The computer could also be "programmed" to automatically send the message during the night when you are sleeping, and the packet network is not busy.

There are some terminal emulators that are designed to be used specifically for packet radio. Some of these can be used only with a specific brand or model of TNC. Most TNC manufacturers sell this software. Some of it is good, and makes it easier to use the TNC. But you don't really need to use this special TNC specific software to operate your TNC. The general purpose terminal emulators that are designed to be used with telephone modems usually work fine with a TNC. Of course there are many features of the general purpose emulators that cannot be used with the TNC, but many of the communications features will work fine. A modem is not that different from a TNC from the computers point of view. Yes the TNC will not dial a phone, but once you are connected to another TNC via packet radio, the computer can't tell the difference between a telephone modem and a TNC. The packet specific terminal emulators sometimes allow the use of certain features of the TNC that would be hard to do with any other type of software. For example, many of todays TNCs allow you to connect to more than one station at a time. The packet specific software will help you determine who you are talking with when you are talking with more than one station at a time. This is where the general purpose telephone modem terminal emulators fall short. If you are new to packet radio, you might want to start out using a general purpose terminal emulator. Many of them are distributed as freeware or shareware, this helps to keep your start up costs down. Other commercial packages may cost anywhere from ten to two hundred dollars.

If you want to get the most out of your TNC, then look into the packet specific terminal emulators available from many sources. I would recommend that you try to find someone who has a version of the emulator

that you are considering and ask them how they like it. Ask them if you could go over to their shack and see how it operates before you buy your copy. Don't be fooled into thinking that the price of software reflects how easy it is to use, or how useful it is. Many people consider terminal emulators to be confusing and mysterious devices. When you consider the functions that they perform, they really are very simple. I have found that those who are confused by terminal emulators usually have trouble understanding what will happen every time they press a key! The confusion seems to come from the fact that some keystrokes may be commands to: 1) The terminal emulator software 2) The TNC. 3) The operating system software. 4) The computer hardware. 5) The remote system that the TNC may be in communications with.

This may be compounded by other details: 1) Is the TNC in command mode (waiting to accept a command)? 2) Is the TNC connected to a remote system (most things typed at this point will be sent to the remote system)? 3) Does the terminal emulator have different modes, so that keystrokes can mean

different things at different times? Does this sound confusing already? Well, it might! Be assured that all it takes is a little reading of the manuals, and some practice. Try to visualize what each keystroke does before you press it. Does it cause the terminal emulator to save a file? Or does it cause the remote system which you are connected to display your mail messages?

Many people ask what software I use with my TNC. You might be surprised at my answer! As a software engineer, you might think that I designed my own super fancy emulator that has all kinds of bells and whistles... or I might use the most sophisticated packet specific software that I could find.... Actually, I use a general purpose telephone modem terminal emulator. By using this software with my TNC, I don't have to learn different commands when I switch between my TNC and my telephone modem. I am familiar with one program, and use it almost exclusively for all my communications needs.... That is until my super-duper-do-it-all-packet terminal emulator software project is complete....

Rich (nm1d@nm1d.nh.usa.net)

**One  
Call.  
...does it all!**

CALL THIS NUMBER on your computer/modem. Use 300-2400 baud at 8-N-1. USATVS system is ON-LINE 24 hours a day, 7 days a week to serve you. It is the nations FIRST all-mode sponsored NATIONAL TELEPHONE BBS! Hundreds are using it each month. Leave messages, READ mail, BROWSE through operating MENUS including the special HAM RADIO section! CAPTURE great articles that are UPLINKED by authors. LIST your FOR SALE items. VIEW or DOWNLOAD over 2,000 programs that reside on C.D. ROM & disk files. Keep in touch with HAM RADIO (when the bands are down) by becoming a regular user!

**ELECTRONIC COTTAGE BBS**  
**1-319-582-3235**  
Sponsored by  
**SPEC-COM Communications & Pub. Ltd.**

SYSOPS: Bill FAY KA0FDI, Pat Powers, Jim Bussan  
Mike Stone WB0QCD and Mike Donovan KAOJAW

**AUTHOR/CONTRIBUTING EDITOR UPLOADS:** Select [M]essage Area then [P]ost a Message. Answer questions and leave a message about UPLOAD. [S]ave Message and Follow TEXT FILE UPLOAD instructions. Store in ASCII files.  
For More Information: Call WB0QCD at (319) 452-3628.

# URGENT!



IN COOPERATION WITH SPEC-COM COMMUNICATIONS & PUBLISHING GROUP Ltd and THE UNITED STATES ATV SOCIETY - PLEASE HELP US FIND

## MEGAN



3 FT. TALL

30 LBS.

BROWN  
HAIR

BROWN  
EYES

LAST  
SEEN  
3/27/91

TYLER,  
TEXAS

NCIC # M  
482409768



• MEGAN ELIZABETH GARNER •

**STRANGER ABDUCTION  
IMMEDIATE ACTION REQUIRED!!!**

IF YOU HAVE ANY INFORMATION – PLEASE CALL  
THE TYLER POLICE DEPARTMENT

(903) 531-1000

OR

**INTERSTATE ASSOCIATION FOR  
STOLEN CHILDREN**

I.A.S.C.

1-800-468-3545

## "ON-THE-G.O.E.S." WEFAX Column

by Gregory Mengell KA6DPV

10563 Zibbia,  
Rancho Cordova, CA 95670  
1-800-468-3545

### DAYTON HAMVENTION WEFAX REPORT

Tom Glembocki of Apex, North Carolina sent in this DAYTON HAMVENTION WEATHER FAX REPORT which follows. I had plans on making Dayton but had a last minute MISSING CHILD emergency case that took me to Texas instead. Maybe next year? Before we get into what happened with the WEFAX mode at Dayton, I'd like to first thank the USATVS national ATV organization and SPEC-COM Communications & Publishing Group Ltd. for joining the INTERSTATE ASSOCIATION for STOLEN CHILDREN (I.A.S.C.) Network! By participating, it means a couple more thousand eyes out there looking for our missing kids. It means a lot to me to see my fellow "Amateurs" joining in on a cause I believe so strongly in. I congratulate "SPEC-COM" for once again, taking the leadership position among all other Ham Magazines by publishing photos and information of our lost children (page 66).

#### FROM TOM GLEMBOCKI...

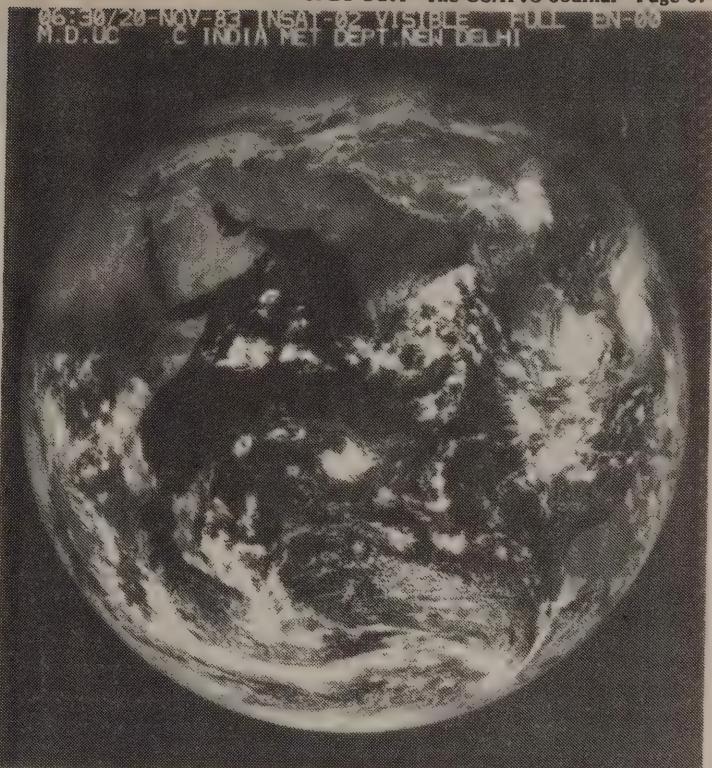
The Amateur WEFAX and APT community was well represented at the 1991 Dayton Hamvention. Under a partly cloudy and sometimes rainy sky, thousands turned out for what is becoming the premiere event in the hobby of environmental satellite remote sensing. If you made it to Dayton this year you would have seen spectacular meteorological pictures from the new Russian Meteor 3-4 which was launched April 24th, images from the WEBERSAT amateur satellite, full color images from the Chinese Fen Yun-2, HRPT from NOAA and Chinese birds, HRPT-like pictures from the military DMSP satellites, full disk images from GOESTAP, wire photos from Reuters and HF NAFAK pictures from Norfolk. In the Arena parking lots, the outdoor flea market was a bonanza for adding on to your environmental monitoring earth station. In the main exhibition halls the leading environmental satellite vendors were displaying their latest systems. Over at the RAMADA INN NORTH on Saturday night, the USATVS and SPEC-COM Communications sponsored several WEFAX related talks and speakers.

The Schwitteks displayed the latest version of their Multifax hardware - a facsimile card that plugs into an IBM or compatible PC to capture AM data from WEFAX and APT transmissions. The card was designed by members of the Dallas Remote Imaging Group and does not include the capability to demodulate FM data. Software support currently is limited to VGA with no printer support or image analysis tools, however images can be printed using an external program. This card is being positioned to address the needs of the low end budget minded enthusiast.

John Beanland G3BVU/W1 was in his Spectrum International booth (shared with by SPEC-COM) in the main arena exhibiting HRPT downconverters and demodulators by Timestep (England). Software support for the Timestep products is currently evolving with ambitious plans to have a complete package available. John had several HRPT images displaying on the PC monitor in his booth.

Rick Fogle of Quorum was displaying his complete line of downconverter and receiver products as well as plug in demodulator cards for HRPT and weather facsimile. Quorum probably makes the finest line of amateur receiving equipment today. Their downconverter is temperature stabilized meaning it can remain outdoors in a range of temperatures. Their 137 MHz receiver is on a plug in PC adapter card with frequency controllable by the computer. Their 1691 MHz feedhorn is spun aluminum with probes for both vertical and horizontal polarization. This thing sure puts my Folger's coffee can to shame!

Jerry Dahl of OFS software displayed his WeatherFax hardware and version 3.0 software. This hardware/software combination represents the high end of environmental satellite watching (but not the high in price which is only \$232 in kit form). The hardware can do all modes at any line rate and any number of samples per line. All super VGA displays are supported at up to 1280 X 960 in 256 colors. A wide range of printers including 9 and 24 pin dot matrix as well as Laser Jets are supported in a variety of user selectable dither patterns. Expanded memory is supported up to 32 megabytes, meaning you can capture incredibly huge images with this package. Also supported is computer calculated temperature calibration of the AVHRR channels from the NOAA satellites. Because all modes, line rates and samples per line are supported, this package gets images from GOESTAP, WEFAX, APT, NAFAK, REUTERS and AP/UPI. Jerry was displaying various APT,



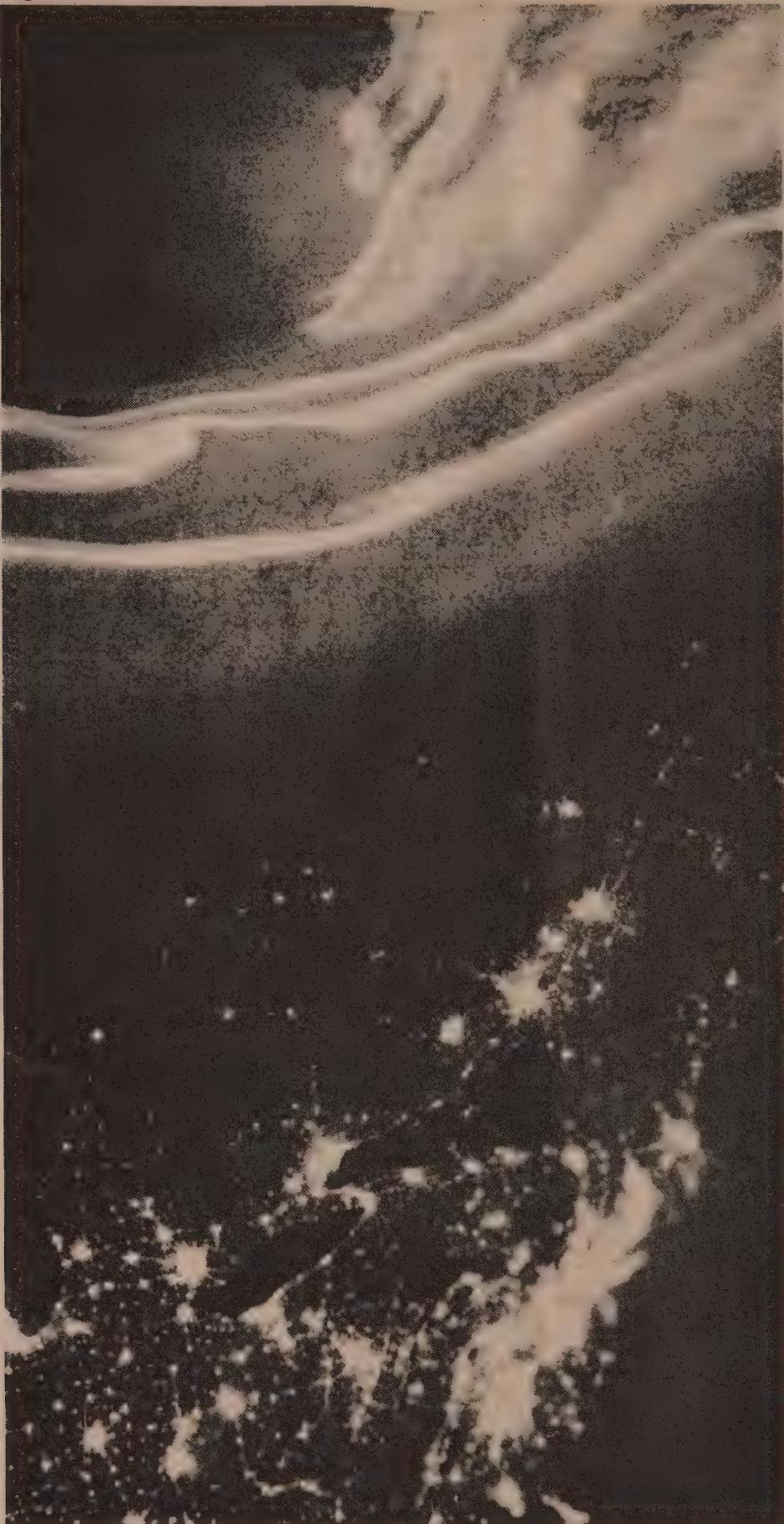
GOESTAP and Russian Meteor 3-4 images at 1024 X 768 X 256. The Meteor 3-4 pictures were noteworthy in that the satellite was launched two days before the start of the Hamvention!

On Saturday morning, April 27th in Hara Arena Room 3, the WX Forum began promptly at 9 am. This event keeps getting better each year in both quality and quantity of presented material. By 9 am the room had filled to standing room only and eventually the overflow crowd spilled out into the hallway. This truly is one of the most popular events at Dayton. The forum began with a slide show presentation by Jeff Wallach in which the basics of polar orbiter mechanics was presented as well as the elements needed to build your own station to receive weather satellites. Jeff showed many excellent images from the Russian and US polar orbiters including views of the continental US, the Dallas/Fort Worth area and the Grand Canyon/Lake Powell areas. Jeff concluded with 3 images received by packet from the WEBERSAT bird. The quality of the WEBERSAT pictures was definitely poor compared with what we were able to receive from today's weather satellites, however when compared with the first pictures returned from space by NASA 30 years ago the comparison is favorable. We have future generations of WEBERSAT's to look forward to!

John Williams was the next speaker. John went over the hardware details and public domain software available for the demodulator card designed by the Dallas Remote Imaging Group. This card is intended to provide an inexpensive entry level to the hobby and combined with some public domain image programs allows someone on a limited budget to participate in remote sensing.

Dr. Tom Kelso provided some status on the research projects he has completed in the past year. We have him to thank for getting the one minute timing ticks on the polar APT images in sync with WWV. It seems that Tom was trying to do gridding of the APT images and needed accurate timing information in conjunction with the satellites orbital elements and therefore requested NOAA to synchronize the spacecraft's clock with WWV. The little tick marks on the edge of the image are now within a few milliseconds of the WWV minute mark! The gridding program itself works by locating a cursor on the image at a known latitude/longitude. In Tom's case this is Wright Patterson AF base. From the known orbital parameters of the satellite and the timing marks on the image, his program calculates the coastal and state boundaries and then overlays them on the image. An interesting side note is that at one time during the year the gridding calculations were not displaying correctly for one of NOAA's satellites. After double checking his orbital elements, Tom called NOAA and informed them that one of their birds had a slight yawing (tilt) problem. NOAA checked into this, confirmed it and promptly corrected the yaw.

Dr. John Dubois presented imagery at .6 km per pixel from the now unclassified military satellite DMSP. According to John, DMSP



**ARE YOU JUST  
GETTING STARTED  
OR READY TO  
UPGRADE YOUR  
PRESENT WEFAX  
SYSTEM?**

Sure, of course shop around. Compare features and prices. Then give us a call! TIMESTEP WEATHER SYSTEMS for the IBM (and compatible) PC's is the way to go for the future. Copy Meteosat, GOES, GMS, NOAA, Meteor, Okean and Feng Yun images. Resolution up to 1024 X 768 X 256 including 3D. VGA, SVGA and Mouse supportive.

What other Computer WEFAX system offers 100 frame Automatic Animation or NOAA Gridding and Temperature Calibration, False coloring, Enhancement, 8-bit resolution and on-board PLL to eliminate doppler distortions from polar satellites?

PC/AT(286, 386, 486) Compatible with 640K memory required. Hard disc (12MB free required for 100 frame animate). 8-bit half card slot (OK in Laptops). VGA Graphics. DOS 3.3 or later.

We will match or beat any other USA distributor's prices!  
Give us a call today!

**APT ASSOCIATES**

10563 Zibbia,  
Rancho Cordova, CA 95670  
Call Toll Free  
1-800-468-3545

A quarterly publication for hardware, software and applications of WEFAX, APT, VAS, HRPT and GOESTAP.

**WeatherSat Ink**

The Environmental Satellite Applications Journal  
\$15 US per year

published by  
**Bluebird Greenhouses**  
4821 Jessie Dr. Apex, NC 27502  
\$20 elsewhere payable in US funds

**"ON-THE-G.O.E.S." WEFAX Column continued...**

format is similar to the NOAA HRPT but is older technology. The NOAA birds provide up to 5 IR channels as well as APT while DMSP only contains 2 channels. John also showed slides of his amateur HRPT station as well as tracking dish antenna.

Ed Murashio was the highlight of the WX Forum. He showed the audience some stunning full color images taken by the Chinese Fen Yun-2 and provided a description of his techniques to get the pictures. Three channels of the infrared spectrum scanned by Fen Yun fall in (almost) the visible color range of red, blue and green. By taking these three channels and then shifting the pixel positions of each because the sensors are not optically aligned, Ed was able to combine the channels in software and produce a full color image! Ed also showed slides of his work in calculating the vegetative index for an area. By applying an appropriate color index to the vegetative index derived from the NOAA infrared channels he is able to observe the progress of vegetation and see first hand the severity of droughts or the health of food crops, timber etc.

Jeff Wallach passed out the third issue of JESAUG (Journal of Environmental Satellite Amateur Users Group) for 1990 (labeled 4-1990) at the Forum. This journal used to come out on a regular quarterly basis under its past publishers of Raul Alvarez and then Greg Mengell but unfortunately we have only seen three issues in the past three years under the Dallas leadership. At Dayton there was much grumbling and many complaints to be heard over the present JESAUG status. "SPEC-COM" Magazine (formerly AS ATV Magazine), a longtime supporter of the WEFAX mode, has also published similar JESAUG newsletter concerned comments. Fred Sharp W8ASF includes WEFAX topics and reports in his regular SSTV column. Recently, SPEC-COM hired Greg Mengell to edit a regular, in-depth, devoted WEFAX column. In order to fill some of the void left by a good newsletter for environmental satellite users, BLUEBIRD GREENHOUSES has been publishing "WeatherSat Ink" as a quarterly journal covering all aspects of environmental satellites (\$15.00 per year). BLUEBIRD is committed to publishing on a regular timely basis - period! Trust is a product to them, a product they have developed over many years. For inquiries include a SASE, for orders include your check and mail to: BLUEBIRD GREENHOUSES, 4821 Jessie Dr., Apex, NC 27502 or enclose remittance in check and money order. Watch for an authorized "exchange of ads" and articles cooperation agreement between WeatherSat Ink and SPEC-COM in future issues!

73's - Tom Glembotzki (919) 362-8532 (Home after 5 pm) or 543-8376 (Work 8 am to 4 pm EDST).

[Greg Mengell KA6DPV] I am including a spectacular WEFAX photo in this issue sent to me from Hank Brandli, Satellite Meteorologist (3165 Sharon Drive) in Melbourne, FL (32904). Hank's November 1987 9 pm EST DMSP night photo is one of my favorites of all-time! How about some of you sending me some of your favorite WEFAX imagery photos for SPEC-COM? The photos will not be cut or harmed in any manner and will be returned as soon as possible, I guarantee. Back to the photo on page 68: Those are not clouds at the top of the picture. It is a rare captured look at AURORA (Northern Lights) illuminating eastern Canada below along with the city night lights of our eastern seaboard and Great Lakes area! Isn't it spectacular? One captured image like that every once in awhile makes all the hard work worthwhile... 73's KA6DPV.

**T.E. SYSTEMS 4450G REVIEW Continued....**

not better than) 175 watt claimed level. Peak power must be realized on wideband AM modulated FSTV operation. Those running 100 watt class amplifiers usually see 25-40 average watts (dependent upon the contrast level of the fed video picture) on a BIRD-43 wattmeter. The 4450G delivers twice that much "viewed" and P.E.P. power (even at 439.250 MHz).

Pictures transmitted on ATV using the 4450G are stable and of good quality reported by several stations near and far (40 miles out). I have not had the chance to check out color or audio sub-carrier as yet as we neared Dayton at the actual time of testing. I'll report on that testing in a future issue.

I elected to cut the bias way back on the PCE unit to operate efficiently. Changing it to a darker picture greatly increases viewed power on the Bird wattmeter but do not be tempted. Ask rather for visual sight reports and be satisfied with whatever the Bird says on a good stable and locked picture with good contrast. You are putting out the 160 to 175 watts of power - you just can't measure it properly. I also recommend installing a muffin or squirrel cage fan to blow lots of continuous air down on the 4450G's large heat sink fins when in operation to dissipate heat buildup. Even though it is over temperature protective, why make it labor so hard?

As for the GaAsFet receive preamp located inside the amplifier, it works to restore the loss of signal that goes through the relays and circuitry of the unit. I have an Advanced Receiver Research GaAsFet preamplifier mounted at the antenna and am using 7/8 inch hardline on my system and so I did not notice very much difference in or out of line. In fact very little. To someone else however, with no mast-mounted preamplifier or a lossier coaxial cable line, it might make a P-unit or better significant difference.

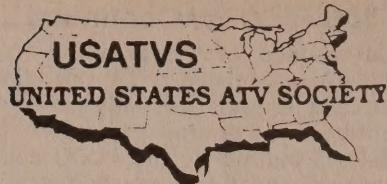
The price is steep, over \$500.00 at most dealers. You get what you pay for. Do you want to go first class with quiet, respectable BIG power without having a cumbersome, large heat-furnace, AC power sucking, tube type amplifier taking up a lot of shelf space? More on this amp and its performance as I run it through its' paces in summertime DX and local contacts. So far, it looks like a good buy... -WB0QCD

**"The SPEC-COM Journal" (tm) Is Available At These 50 Amateur Radio Retail Dealers!"**

(Verifiable Requested Order & Paying Accounts - Not Unsolicited Free Distribution)  
For Guaranteed Sale Discount Retail Dealer Information, Send SASE or Call Our Clarence, IA Advertising Office: (319) 452-3628

**USA [EAST]** Delaware Amateur Supply-New Castle DE; Ham Radio Outlet-Salem, NH; Spectrum International-Concord MA; Lentini Communications-Newington CT; VHF Communications-Jamestown NY; Rivendell Electronics-Derry NH; Al LaVorgna WA2OQJ-Hicksville NY; JRS Distributors-York PA; **[MIDWEST]** ESF Copy Service-Cedar Falls IA; Closed-Circuit Video-Tipton IA; Dale Lam Enterprises-Kansas City MO; Missouri Radio Center-Kansas City MO; The Ham Station-Evansville IN; Oklahoma Comm Center-Oklahoma City OK; North Olmstead Amateur Radio-North Olmstead OH; Associated Radio-Overland Park KS; Universal Amateur Radio-Reynoldsburg, OH; Dandy's-Wellington, KS; Ham Heaven Wheeling IL; Ham Radio Toy Store-Wheaton IL; Wyman Research-Waldron IN; Gateway Electronics-St. Louis MO; Erickson Communications Chicago IL; Amateur Radio Equipment-Wichita Falls KS; **[WEST]** Ham Radio Outlet (all 11 stores!) in Anaheim Burlingame Oakland San Diego Van Nuys CA; Godley Radio Shack-Bakersfield CA; Ham Radio Outlet-Denver CO; Ham Radio Outlet-Phoenix AZ; Henry Radio (2 stores) in Los Angeles CA; Amateur Electronics Supply-Las Vegas NV; Gateway Electronics-San Diego; Gateway Electronics-Denver CO; Powell's Technical Book Store and Ham Radio Outlet-Portland OR; A-Tech-Burbank CA; Interstate Association for Stolen Children-Rancho Cordova, CA; **[SOUTH]** Ham Radio Outlet-Woodbridge VA; Ham Radio Outlet-Atlanta GA; Amateur Electronics Supply-Clearwater and Orlando FL; Mike's Electronics-Ft. Lauderdale FL; Electronic Center Inc.-Dallas TX; Austin Amateur Radio Supply-Austin TX; Gateway Electronics-Houston TX; **[CANADA]**: COM-WEST Radio Systems Ltd.-Vancouver, B.C.. **"Is Your Store Not Listed? Call Today And Join The Network!"**

**SPEC-COM COMMUNICATIONS & PUBLISHING GROUP Ltd., P.O. Box 1002, Dubuque, IA 52004-1002**  
**#1 Read & Distributed Amateur Radio "All-Mode" Specialized Communication Publication In The USA!**  
**OUR 24th Year - Since 1967! (Including A5 ATV Magazine Production)**



**FOR SALE** - Two "C"-mount TV camera zoom lenses. Cannon 15-75 mm \$90.00. Panasonic 10-150 mm with MACRO function \$160.00. Prices include FREE UPS shipping. Call Mike Lega at (201) 348-7493 or 997-2614 or write: 20 Prospect Place, Kearny, NJ 07032. Thanks SPEC-COM for the FREE Ad!

**HAVING TROUBLE WITH THAT EXAM?**  
- The SECRET to passing any theory exam is knowing how to correctly answer those certain questions you don't understand. A new, proven approach works even with learning or mastering the CW MORSE Code! Send an SASE and I'll tell you about my 60 minute audio success tape "YOU WILL UPGRADE" \$7.95 plus \$1.00 s/h. Gordon West approved. Not a CW practice tape. Dave Schoenthaler K0HBQ, Longview, Maquoketa, Iowa 52060.

**FOR SALE** - Used, factory-built ROBOT 1200C Color SSTV Converter. Good working condition. Not so attractive home-brew, tin cover. You'll probably want to get a new one from company. Owner died. \$750.00. Great price! Make contact via Mike Stone WB0QCD (319) 452-3628.

**FOR SALE** - Like new, 12" SONY Trinitron PBM-1271 HI-RES Color Monitor. Has multi-sync PAL-NTSC-SECAM. 2 channels composite, analog, RGB or digital RGB. \$700.00. AVCOM 3R TVRO receiver \$400.00. Custom Industrial C Band RCVR with sub-carrier. Model JFX-1000A \$500.00. Comes with LNA. Shipping added. 1-Ranger 3500 XCVR for 10 meters. New in box \$200.00. 1-Muirhead FAX Machine. Near photo quality. Electrolytic paper. Good condition \$400.00. Some spare parts. Contact Greg Mengell KA6DPV 1-800-468-3545.

**LOOKING** for RADAR buffs! I am interested in getting together a group of Hams that are already or want to get more involved with RADAR transmissions and signals. Contact Skip Voros WD9HAS (414) 475-6200. 1537 S 81st, Milwaukee, WI 53214.

## USATVS MEMBERSHIP CLASSIFIED ADVERTISING

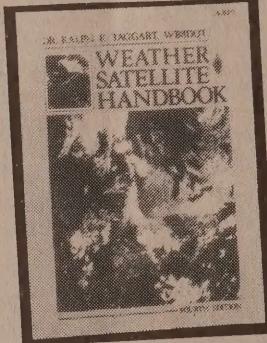
"FREE" classified advertising for our "valued" & supportive members! 50 words maximum, restrictive to Amateur Ham Radio, video or electronic related equipment. Ads run twice unless renewed. Commercial Ads: 25 cents per word - prepaid with order. Not responsible for errors. Send in your Ad to us today!

**FOR SALE** - Regency MX7000 Scanner \$260.00/BO, AEA MBA-RO Reader \$95.00/BO, INFO-TECH M-600 \$250.00/BO, DESK FAX Converter M-800 \$240.00/BO. All equipment excellent & in mint shape! Manuals included. Contact Ken Brand (703) 667-2616, 116 Oakwood Court, Winchester, VA 22601.

**GOING 386SX SUPER VGA!** TANDY 1000SX IBM Clone computer (with installed video output board (RCA) great for FSTV feeds!) CGA "enhanced" system, 20 MB HD with dual 5.25" floppy drives. Smartwatch. MS DOS 3.3. 300-2400 baud internal modem card. Model CM-11 HI-RES Color Monitor, Joystick and Mouse. Excellent working condition guaranteed. All manuals. Some software. All the pages of SPEC-COM are created on this computer! First \$950.00 takes. Here's your chance to move up to IBM type gear! Contact Mike Stone WB0QCD at SPEC-COM. (319) 452-3628.

### THE WEATHER SATELLITE HANDBOOK

By Dr. Ralph Taggart.



**NEW WEATHER SATELLITE HANDBOOK!** by Dr. Ralph Taggart. 180 pages, 4th edition. Purchase from any ARRL Publications Dealer \$20.00.

## Advertiser Index

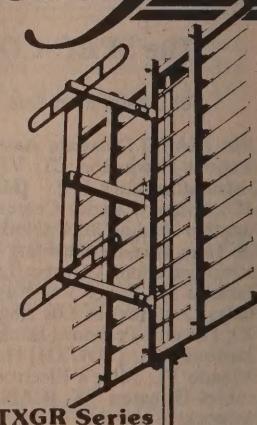
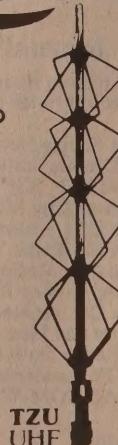
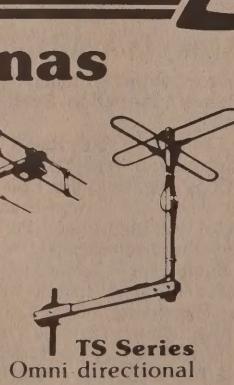
Company	Page #
AEA Inc.	37,72
Advanced Receiver Research	56
Alpha Delta Comm. Inc.	35
AMSAT	63
APT Associates	68
Classified Advertising	70
Electronic Cottage BBS	65
Heil Sound	61
Henry Radio - Los Angeles	14
International Crystal Co.	38,46
Intersate Assc. Stolen Child.	66
Kenwood USA Corporation	2,71
KJ4CQ Circuit Projects	22
Lindsay Commercial Antennas	70
Micro Video Products	46
Micro Computer Concepts	47
Mirage/klm	38
Monitoring Times Magazine	47
Pauldon Associates	43
QSO Amateur Radio Network	56
Radio Amateur Callbook Inc.	56
Radio Electronics Magazine	36
RTTY Journal	58
Rutland Arrays	46
Spec-Com Journal	4,23,35,69
Spectrum International Inc	6
T.D. Systems	8
T.E. Systems	36
Time-Step WEFAX (Spectrum)	47
U.S. ATV Society	4,11,35
VHF Communications	55
Visual Concepts	61
Weather Sat Ink	68
Worldradio News	41
Wyman Research, Inc.	21

# LPTV

## Commercial Antennas



# Lindsay



- ★ Custom engineered to your specifications
- ★ Weather protected for any climate
- ★ Vertical, horizontal or omni-directional
- ★ VHF/UHF, single channel or broadband

**LINDSAY SPECIALTY PRODUCTS**

50 Mary Street, Lindsay, Ontario, Canada, K9V 4S7 (705) 324-2196 FAX: 705 324 5474

# KENWOOD

## Mobile Companion!

**TM-241A  
TM-441A/TM-541A**

**Compact FM Mobile  
transceivers**



Here are your new mobile companions — at your service whenever you're on the road! Their compact size makes installation a snap, and the remote control options allow you to customize your installation for that "professional" look!

- **Wide band receiver coverage.** The TM-241A receives from 118–173.995 MHz. Transmit range is 144–148 MHz. (Modifiable for MARS and CAP operation, permits required.)
- **TM-441A** covers 438–449.995 MHz, and the **TM-541A** covers 1240–1299.995 MHz.
- **CTCSS encode built-in, selectable from the front panel.**
- **Selectable frequency steps** for quick and easy QSY.
- **TM-241A provides 50 W. TM-441A 35 W, and TM-541A 10 W.** Three power positions, 5, 10, and full. The TM-541A has two power positions, 1 and 10 watts.
- **20 full-function memory channels** store frequency, repeater offset, sub-tone frequencies, and repeater reverse information. **Repeater offset on 2m is automatically selected.** There are four channels for "odd split" operation.
- **Tone Alert System with Elapsed Time indicator.**
- **Auto-power off function, and time-out timer.**



### RC-20 Remote Control Unit

As supplied, one RC-20 will control one transceiver. **Most often-used front panel functions** are controllable from the RC-20. The RC-20 and IF-20 combine to allow control of up to four radios.

- **Selective calling and pager option.** The DTU-2 option enables the Dual Tone Squelch System (DTSS), allowing selective calling and paging using standard DTMF tones.
- **Digital recording system option.** Used in conjunction with the tone alert system, the DRU-1 allows message storage of up to 32 seconds.
- **Multiple scanning functions.** Band and memory scan, with selectable scan stops and memory channel lock-out.
- **Large LCD display with four-step dimmer control.**
- **Automatic Lock Tuning (ALT) for the TM-541A.** Compensates for drift.

**Supplied accessories.** Mounting bracket, DC cable, fuses, MC-44DM multi-function DTMF mic.

### Optional accessories

- **DRU-1** Digital Recording Unit
- **DTU-2** DTSS unit • **IF-20** Interface unit, used with the RC-20, allows more than two transceivers to be remotely controlled • **MA-700** 2m/70cm dual band antenna with duplexer (mount not supplied) • **MB-201** Extra mounting bracket • **MC-44** Multi-function hand microphone • **MC-55** (8-pin) Mobile mic. with time-out timer
- **MC-60A, MC-80, MC-85** Base station mics. • **PG-2N** Extra DC cable
- **PG-3B** DC line noise filter • **PG-4G** Extra control cable • **PG-4H** Interface connecting cable • **PG-4J** Extension cable kit • **PS-50/PS-430** DC power supplies • **RC-10** Handset remote controller • **RC-20** Remote control head
- **SP-41** Compact mobile speaker
- **SP-50B** Mobile speaker • **TSU-6** Programmable CTCSS decoder

KENWOOD U.S.A. CORPORATION  
COMMUNICATIONS & TEST EQUIPMENT GROUP  
P.O. BOX 22745, 2201 E. Dominguez Street  
Long Beach, CA 90801-5745

KENWOOD ELECTRONICS CANADA INC.  
P.O. Box 1075, 959 Gana Court  
Mississauga, Ontario, Canada L4T 4C2

# KENWOOD

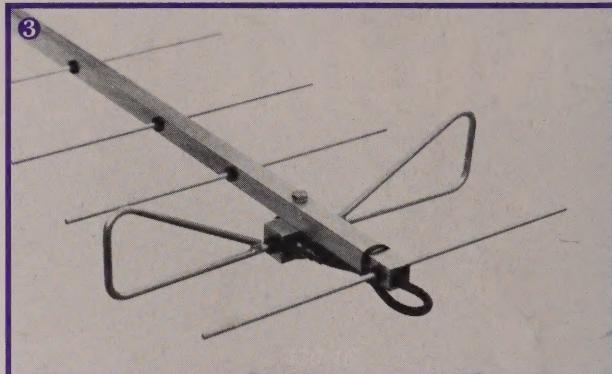
...pacesetter in Amateur Radio

**high-quality**



**low-cost**

# Amateur Television Products



① **NEW! VSB-70 ATV Transceiver:** the only amateur television transceiver utilizing VSB (Vestigial Sideband) technology to minimize adjacent channel interference and preserve spectrum space; built-in UHF GaAsFET preamp to improve reception; covers the 70 cm band, 420 - 440 MHz; inter-modulation distortion less than -42 dBc; one watt PEP output; monitor transmitted and received signals on your standard TV receiver; audio and video input via front panel 10-pin camera jack or rear panel RCA audio and video inputs (switchable); crystal-controlled or variable-tuning down converter; crystals for 434 and 439.25 MHz are included; optional crystals for 421.25 and 426.25 are available; requires 13.6 VDC @ 1.5 amps ..... \$349.95

② **NEW! RLA-70 Remote Linear Amplifier with Power Supply:** mast-mounted amplifier boosts your ATV signal up to 50 watts PEP; equivalent to a 100 watt amplifier in the ham shack with a 3 dB line loss; built-in GaAsFET preamp mounted at the antenna where it does the most good; power supplied through the coax; includes MPS-100 Multi-purpose Power Supply: provides a well-regulated 28V DC @ 6 amps for the RLA-70; also provides regulated 13.6V DC @ 2 amps for the VSB-70 ..... \$699.00

③ **430-16 Antenna:** high-performance, computer optimized yagi specifically designed for ATV operation; broadband frequency

coverage from 420 to 440 MHz; 16 elements give you 14.3 dBd gain; O-ring sealed connectors; 28 degree E-plane beam width; 32 degree H-plane beam width; 10 foot boom ..... \$119.95

④ **AVT Master Amiga Video Terminal:** SSTV and FAX system (hardware and software) for transmit and receive with your Commodore Amiga Computer; 55 SSTV modes in up to 4,096 simultaneous colors; Nine FAX modes in up to 16 grey levels; eight function "repair kit" vastly reduces damage caused by QRM or QRN; on-screen tuning scope; mode-to-mode conversions; interpolating zoom; image tinting, brightness and contrast control; text overlay using multiple fonts, boldface, italics and underlining in any combination or color; automatic CW and/or synthesized speech ID after transmit; custom color bar generation; user-defined FAX demodulation curves; image rotation and flipping; paint compatible; extensive ARexx language support; real-time software filtering for scope and receive operations; grab screens to transmit from any digitizer or operating program in real-time; automatic start and run at any time; image printing in both black-and-white and color on hundreds of printers ..... \$299.95

Specifications subject to change without notice or obligation. Prices listed are suggested Amateur Net through participating dealers.

Technical support may be obtained through CompuServe's Hamnet forum. Messages should be sent to user ID #76702, 1013.

## Advanced Electronic Applications, Inc.

P.O. Box C2160 / 2006 196th St. S.W. Lynnwood, WA 98036-0918

Technical Support & Sales: (206) 775-7373 Fax: (206) 775-2340

© Copyright 1991 by AEA, Inc. All Rights Reserved.